Employment Study and Capacity Needs Assessment for the Fisheries Sector in Seychelles

Seychelles Fishing Authority

RFP07

Final Report

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Submitted by

MRAG

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Abbreviations

Acronym	Definition
BSFC	British Seychelles Fisheries Commission
CEDAW	Convention on the Elimination of all Forms of Discrimination against Women
CEO	Chief Executive Officer
CHN	China
DEFRA	(UK) Department of Food and Rural Affairs
ERD	Entity relationship Diagram
ESA	Enterprise Seychelles Agency
ESP	Spain (Three letter code)
FAO	Food and Agriculture Organisation (of the United Nations)
FEP	Fisheries Emergency Plan
FRA	France (Three letter code)
FSA	Financial Services Authority*(Seychelles)
FTE	Full Time Equivalent
GBR	United Kingdom of Great Britain and Northern Ireland (Three letter code)
GDP	Gross Domestic Product
GOP	Gainful Occupation Permit
HORECA	Hotel, Retail and Catering (Sector)
ICSE	International Classification of Status in Employment
IDC	Island Development Corporation
IDN	Indonesia (Three letter code)
IEA	Industrial Estate Authority
ILO	International Labour Organisation
IND	India (Three letter code)
IOT	Indian Ocean Tuna
IOTC	Indian Ocean Tuna Commission
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
ISIC	International Standard Industrial Classification
ISO	International Standards Organisation
ITA	Italy (Three letter code)
ITZ	International Trade Zone
LKA	Sri Lanka (Three letter code)
MCS	Monitoring, Control and Surveillance
MEHRD	Ministry of Education and Human Resources Development
MFJ	“My First Job” Scheme

Acronym	Definition
MUS	Mauritius (Three letter code)
MYS	Malaysia (Three letter code)
NDS	National Development Strategy
NGO	Non-Governmental Organisation
NSB	National Statistical Bureau
NZL	New Zealand (Three letter code)
ODK	Open Data Kit
OECD	Organisation for Economic Co-operation and Development
PCR	Polymerase chain reaction (COVID test)
PHL	Philippines (Three letter code)
PTE	Part-time Equivalent
RFP	Request for Proposal
SCR	Seychelles Rupee
SDG	Sustainable Development Goal
SDP	Skills development Programme
SDWCP	Seychelles Decent Work Country Programme
SFA	Seychelles Fishing Authority
SLA	Seychelles Licensing Authority
SME	Small to Medium Enterprises
SQL	Structured Query Language
SRP	Seychelles Rupee
STB	Seychelles Tourism Board
STC	Seychelles Trading Company
STCW	Certification and Watchkeeping for Seafarers
SWOT	Strengths, Weaknesses, Opportunities and Threats
SYC	Seychelles (Three letter code)
TCAC	(IOTC) Technical Committee on Allocation Criteria
TOR	Terms of reference
TVET	Technical vocational education and training
TWN	Taiwan, Republic of China
UNESCO	United Nations Educational, Scientific and Cultural Organization
URS	Unemployment Relief Scheme
USD	United States Dollar

EXECUTIVE SUMMARY

This study was commissioned to provide the Seychelles with an updated understanding of the current state of the fisheries and related sectors and requirements for the onward development of this sectors. A number of key objectives were addressed initially through a number of tailored questions. Additional sections were added to the study to address issues related to the COVID-19 pandemic and additional data that could be collected and reported at the same time as this study relating to fishers' pensions and sickness benefits.

Surveys to collect the information to meet objectives and address specific questions were designed, tested and verified in conjunction with SFA via the Project Steering Committee, including traditional paper forms, Internet web interfaces and a mobile phone application for fishers. All data collected were imported into a single project database for analysis. The data collection forms, paper and electronic (Lime Survey and Android application), database (MS Access) and analysis routines (R) have been provided as project deliverables to SFA.

In summary, data were collected from 5,282 individuals in the fisheries and related sectors. These were split between 1,788 related from the fishing sector (1,278 artisanal sub-sector, 132 from the semi-industrial fishery, 130 from fisheries targeting invertebrates and 5 from the aquaculture sub-sector). A significant gap occurred from the sport fishery due to inactivity due to the pandemic and some privacy concerns. A total of 3,494 individuals were reported from the non-fishing sub-sectors, the majority (1,748) from the processing sector.

Analyses were conducted across a number of variables including:

- Sector (defined by ISIC code with specific local additions);
- Gender;
- Age;
- Nationality;
- Full time / Part time employment status;
- Occupation (defined by ISOC codes);
- Education level; and
- Wage (defined by local wage bands).

Key results identified from this analysis included the following:

Particular issues were identified during the study and in particular through semi-structured questionnaire responses and stakeholder engagement workshops in a number of areas as follows:

Labour related issues: Youth unemployment is an issue, though in the Seychelles gaps in fisheries and related sectors appear to be filled more commonly through foreign labour (India, Madagascar, Mauritius, the Philippines and Sri Lanka as the most common reported though many more nationalities are present) Stakeholders identified gaps in the fisheries sector (artisanal and longline sub-sectors) and in a number of technical areas related sub-sectors such as fisheries management (research and management skills), machine operators and maintenance, refrigeration specialists, quality control and production systems.

In the fisheries sectors, there is a net loss position in terms of numbers with fewer fishers entering the artisanal fishery compared to those leaving or retiring. Although newly trained artisanal fishers are trained by the Maritime College each year the recruitment into the fishery is low due to low levels of completion of the training course and even fewer entering the fishery.

Some stakeholders highlighted that for related sectors, it is not necessarily a skills gap that is important to them filling positions but simply a shortage of the number of people prepared to do a particular job. The more technical roles of machine operators, refrigeration technicians

and mechanical and electrical maintenance were highlighted a number of times. Difficulties were noted in companies being able to source and employ permanent qualified staff. These limited qualified personnel in the Seychelles, are therefore in great demand and foreign labour are seen as more reliable and flexible workers.

There are a number of sub-sectors with significant proportions of foreign workers, for fishing sub-sectors these include the purse seine, longline, semi-industrial and sea cucumber sub-sectors. Stakeholders identified a clear requirement for foreign labour to address skills gaps in the local workforce and to fill vacancies that Seychelles' workers are not prepared to fill (e.g. those requiring shift work).

Gender related issues: Few gender related issues exist. Equal rights appear to be respected throughout the Seychelles, although the particular rules may not be clearly known and understood be all employers. However, traditional gender based roles dominate with the direct fishing sub-sectors and transport and storage sector are male dominated (being all >99% male). No gender bias in the equality of opportunities exists but this may simply an artefact of women not applying for these roles. Where sectoral gender opportunities are clearly more equal, wages (range and variability) within those sectors show no gender bias.

Age related issues: There are clear issues pending in the future with an ageing population in three key sectors artisanal fishing, processing and transportation where the age bands for 35-44, 45-54 and 55-64 age groups are dominant and the latter two in particular for the artisanal fishery. Younger age group workers are not entering these three sub-sectors and a continually aging workforce would continue to occur without action for development through training, business development and progression opportunities. In order to address these issues, fishers were asked to provide recommendations to address youth recruitment. These included better working conditions when working at sea and unsociable hours shift work, better wages, benefits and protections compared to other sectoral opportunities. Education and training with long-term funding, in fisheries related subjects are needed to encourage entry into the sector and furthermore into more skilled roles and progress to higher levels in the fisheries sector, but also a more generic education on fishing and the environmental sector to increase awareness and understanding of these key areas to the Seychelles economy both through fishing and other sectors (e.g. tourism). Respondents also noted significant negative factors that could stop entry into the fishing sector or related sectors including drug use and clearly better financial and lower risk opportunities in other sectors.

Domestic and foreign labour recruitment - A number of critical sub-sectors were identified where there is clear competition for jobs exists between domestic and foreign labour. For the four marine fishing sub-sectors purse seine, longline, semi-industrial and sea cucumber (artisanal being protected) a skills gap exists where a reluctance by Seychellois to work in these sectors were identified. For the processing and cargo handling sectors, stakeholders noted that the nature of working in these sectors would be considered physically hard work, often shift-based and in difficult conditions, e.g. indoors on non-air conditioned factory floors. Similar to the fisheries sectors, stakeholders noted a reluctance towards shift work and some even going further to note that some Seychellois were considered 'lazy' compared to foreign workers. These issues could be addressed through training within the higher paying fisheries and processing sectors. Changing the attitude of the Seychellois workforce is more difficult and requires education starting at the primary and secondary level to change attitudes of future generations.

Human capacity needs assessment – The stakeholder engagement process identified the biggest demand for local workers is in the semi-industrial fishing sub-sector where requirements for able seamen, skippers, divemasters and mechanics were identified. The development of port facilities in Victoria or other sites will meet short term needs for the expansion, and long-term for small numbers in specialised roles in regulatory authorities (e.g. monitoring, control and surveillance). Other roles in related sectors that have been identified

include fibreglass plant workers, fish processing, machinists, mechanics, electricians and net technicians.

COVID-19 was shown to have had a significant impact on fisheries related businesses and productivity. Government efforts to assist the fisheries sector were shown to be effective with fisheries specific measures being better regarded than generic government responses when addressing fishers concerns.

Further to this, the study was extended to cover pensions, insurance, sick leave and registration to determine the level of dependency of artisanal fishers on government for short-term insurance provision or sickness benefits and long-term pension contributions. A number of unregistered (i.e. registered with SFA) artisanal fishers exist and these individuals were shown to be less likely to claim benefits or have a pension though no information on the reasons behind this could be determined.

A validation workshop was held remotely over two consecutive days between 26th and 27th January 2022. Stakeholders from different sub-sectors were invited to each meeting to review and comment on the findings of the project.

***

1 INTRODUCTION

MRAG Ltd has been contracted by the Seychelles Fishing Authority (SFA) to undertake the "Employment Study and Capacity Needs Assessment for the Fisheries Sector in Seychelles". The project Terms of Reference were issued as RFP 07 under the Third South West Indian Ocean Fisheries Governance and Shared Growth Project (SWIOFish 3).

The main objectives of the study were:

- Identify the level of employment and wages earned in the fisheries and fisheries related sector.
- Determine the relative importance based on individual international standard industrial classification of all economic activities (ISIC) and including relative contribution to public finances, accounting for losses due to foreign labour employment, of the fisheries and fishery-related sectors compared to other sectors.
- To determine the human capacity needs of the industry so as to better understand the obstacles that inhibit its agents from realising their development goals.
- Devise a formal statistical approach for deriving employment-related information systematically, which could serve as basis to monitor changes over time and potential consequences of changes in national or international fisheries policy.

Given the current circumstances, a couple of additional objectives were added to (i) determine the impacts of COVID-19 pandemic on the fisheries sector and (ii) determine the level of dependency of artisanal fishers on government for short-term insurance provision or sickness benefits and long-term pension contributions.

The project was initiated in January 2020, but was subject to considerable delays due to COVID-19 pandemic. This affected both in-country data collection and final dissemination through stakeholder workshops, which were held remotely in January 2022.

Further details of the technical approach and methodology is presented in section 2. A summary of the analysis is presented in section 3, with further outputs presented in Annexes. Further details of the impacts of COVID-19 are presented in section 4. A discussion and conclusions, including a summary of a stakeholder validation workshop are shown in section 5.

2 TECHNICAL APPROACH AND METHODOLOGY

This consultancy report has been developed to provide the Seychelles with the necessary understanding of the current and developing sector. It has four stated objectives listed below:

(i) **Identify the level of employment and wages earned in the fisheries and fisheries related sector** – It is necessary that the number of full-time equivalent (FTE) workers and their wages are clearly understood within the sector. In some sub-sectors, workers may be full time employees working all year round. Others may be part-time with other jobs or may be highly seasonal workers (e.g. the bêche-de-mer fishery, artisanal fishers and stevedores) who work in other parts of the sector or even other sectors at other times of the year. The dynamics of this critically important sector of the Seychelles need to be understood both now and via trends looking into the future.

(ii) **Determine the relative importance based on individual international standard industrial classification (ISIC) of all economic activities and including relative contribution to public finances, accounting for losses due to foreign labour employment, of the fisheries and fishery-related sectors compared to other sectors** – It is critical to understand the relative importance of all sectors within the Seychelles economy, and within the fisheries sector in particular the relative importance of each of the sub-sectors. Using the standard framework established under ISIC[1] (i.e. for fishing ISIC 05) we will determine the relative importance of each sub-sector and other relative sectors as calculated for the Seychelles economy. Through the project we will establish those sectors where losses are made due to foreign labour and other businesses where the final end point for profits are outside the Seychelles, giving a clear understanding of the true value of benefits to the Seychelles instead of the top line figures that may be distorted but also to consider the downstream benefits to local businesses such as property rental.

(iii) **To determine the human capacity needs of the industry so as to better understand the obstacles that inhibit its agents from realising their development goals** – Once the relative size and composition of the fisheries sector has been established and members of the sector consulted (via a SWOT analysis) as to where they see strengths, weaknesses, potential opportunities and threats to the sector and parts of it, this information along with current and proposed capacity in various roles can be compared and obstacles identified. If for information there was a clear gap in the management of a particular fishery, because there were insufficient skills or experience to fill this role, a mitigation strategy could be developed to remove that obstacle over time e.g. short-term bring in external skills, medium-term train local staff in the skills required and in the long-term establish local training and skill development to ensure gaps and threats are addressed; and

(iv) **Devise a formal statistical approach for deriving employment-related information systematically, which could serve as basis to monitor changes over time and potential consequences of changes in national or international fisheries policy** - Employment sector studies such as this are not as useful as snapshots when compared to a regular survey and analysis conducted every two or three years, which will clearly enable the identification of changes in the sector and trends that have become established. A formal statistical approach developed

[1] ISIC as defined by the United Nations Statistics Division (https://unstats.un.org/home/).

during this project alongside representatives of the Ministry of Fisheries and Agriculture and Seychelles Fishing Authority, to ensure it meets requirements, will be used to generate the first step in this long-term systematic programme, a planning process will be developed to allow the setup of the next planned survey and analysis.

2.1 Methodology

The terms of reference identified 18 individual tasks to be addressed individually in the methodology. To assist in the structure of the project implementation, the 18 tasks were divided into four broad phases of activities to assist in the clear implementation and delivery of the project.

- Inception phase (tasks 1 - 4);
- Survey phase (tasks 5 - 6);
- Analysis phase (tasks 7 - 13); and
- Report writing, recommendations and dissemination (tasks 14 -18).

The **Inception phase** involved a short period of preparatory work by both the Team Leader based in Seychelles and others based in London, including Skype and meetings through internet video systems with SFA Project Focal Point and Project Steering Committee.

This phase included initial briefing meetings of the Team Leader by the Technical Assistant to SWIOFish3 and staff of SFA, initial document compilation and review which was an important component of this phase and a stakeholder analysis, together with SFA, to identify key institutions, associated entities and initiatives relevant to employment in the fisheries sector. The Consultant Team using various sources of data created a stakeholder database that would be used during the survey phase.

This phase also included a review of the ToR, development of an updated work plan and agreement on the methodologies for implementation of the assignment with the Client.

Our previous experience of sectoral studies such as these has shown that it has been critical during the inception phase to identify the results and outputs and reporting formats that were needed in the final phases to present to stakeholders. It was therefore imperative that these were identified during the critical inception phase so that any data required for these could be identified and collected during the survey. It was also important to understand the critical data gaps and data issues so that these could be taken up during the design of the survey.

The **Survey phase** included pilot testing and modifying the surveys that were designed to be used to collect the data required, the development of a survey database and data entry portal. The surveys were designed in conjunction with SFA via the Project Steering Committee. After a period of testing and adjustments and additions to the survey design the full implementation of the survey was conducted via the Lime Survey[2] online data collection survey, the Android phone application and the semi-structured interview format. Each of these tools to facilitate data collection and data entry also included in-built data validation (through restriction of input values and pull-down menus from fixed data sources). At the same time the development of the analytical functionality in analysis phase was started to ensure data produced could be used effectively and a sample data set was extracted at an early stage from the Lime Survey data collection to enable testing. Due to the global COVID-19 pandemic, the survey process encountered difficulties in implementation and as a result face to face interactions with stakeholders were limited to provide protection to both the stakeholders and interviewers and alternative methods e.g. phone interviews rather than in person were used. There were also

[2] https://www.limesurvey.org/

frequent periods during the survey phase that government offices were closed for half-days and with many workers working from home that made some stakeholders very difficult to contact.

The **Analysis phase** was desk based involving a combination of literature review and analysis of the survey outputs. The analysis was developed using a combination of Microsoft Access for query definition and tabular outputs, the statistical package R for graphical outputs and QGIS for map-based outputs. Where possible these functions were developed on the test data to ensure they produced the correct outputs and this also enabled the reproduction of the outputs at a later date with the full dataset. It should be noted that this approach also enables future surveys of the same type to be analysed quickly and in the same format with comparable outputs simply and easily.

The **Reporting writing, recommendations and dissemination phase** compiled the information and analysis gathered into a draft final report for review. Consultation and validation of the findings with stakeholders formed a critical part of this phase prior to delivery of a final report. The validation of the report was planned to be conducted through a workshop involving key stakeholders in the sector. Due to COVID-19 restrictions, we planned on holding a restricted capacity workshop, but this was not possible during the project. Online workshops were considered and not feasible for the majority of the stakeholders.

2.1.1 Identify the main stakeholders (Task 1)

During the inception phase the project team in discussion with the SFA and the Ministry of Fisheries and Blue Economy established a database of the main stakeholders to be contacted and requested to provide information. This included groups such as public sector agencies, private companies, NGOs, civil society associations, boat owners and other activities related to fisheries, including service providers to the fisheries sector as shown in Table 1. This was based on an already relatively complete list due to the team's close links to the Seychelles fisheries sector and previous work including the "Development of a fishing fleet management and licensing system"[3] conducted in the Seychelles.

Table 1. Main groups of Stakeholders identified.

Stakeholder Group
Fisher Associations
Fishing Companies
Shipping Agents, stevedoring, ship chandlers, vessel repairs / yards
Food Processors Bycatch Companies
Government Ministries and Agencies[4]
NGOs
Representatives of the tuna purse seine fishery
Researchers
Fisheries related businesses (Industrial Zones)
Catering Businesses

[3] Contract No: PPAC05

[4] NB: Not all of these stakeholders will be interviewed as part of the project as they are not directly involved with the fisheries sector– they important however in the context of the policies and legislation.

The complete provisional stakeholder list was provided to the SFA and agreed with the Project Steering Committee comprising of SFA, and other relevant agencies as determined. Stakeholder data sources include, the SFA, Department of Tourism, Seychelles Licensing Authority, the Industrial Estate Authority (IEA), the Seychelles Licensing Authority (SLA), and the Enterprise Seychelles Agency (ESA). Other government Ministries were contacted but with varying digress of response. In particular, Education, ANHRD and Employment Department were highlighted as being of importance and were contacted via email and phone. There were no responses from Ministry of Education and Department of Employment. Generally, poor feedback was received from Ministries and Parastatals. IDC and SPA did not respond on the structured questionnaire.

The consultant team acknowledges the support provided by these institutions towards identifying other potential stakeholders in the sector.

The stakeholders were notified by the SFA of the project and the survey, through the local media (press and TV) to allow more widespread notification. The SFA also provided an introduction letter to assist the interviewers with collecting data in the field.

During implementation of the project a complete list of all stakeholders was maintained and updated. This allowed further questioning of the stakeholders during the project, and all data were anonymised as far as possible in the reporting and analysis phase, though they remain in the database. Stakeholders were also encouraged to completed the questionnaire on the online platform for additional data confidentiality.

2.1.2 Devise a statistically robust employment survey and data collection methods (Task 2)

The project team, following on from the inception phase, developed a statistically robust employment survey (ensuring a representative sample size across islands) and associated data collection methods. A draft survey and methods document was developed, based on the requirements of the analysis, our understanding of fisheries sectoral studies and recommendations from the Project Steering committee.

The statistically robust targets were agreed with the Project Steering Committee to ensure that data from sufficient respondents from each sub-sector were collected. Where the number of actors in a sub-sector were considered as small, e.g., shipping agents, a census-based approach was used to ensure all respondents were contacted and appropriate information collected. For fishers, it was not possible to capture the views of every single Seychellois who fishes. Information was collected on over 550 individual fishers and 913 artisanal fishers overall, through interviews of fishers and companies undertaken at landing sites and by telephone. Contact details were obtained through and SFA database of all registered fishers and vessel owners. The telephone approach was employed due the COVID-19 restrictions in terms of social distancing and limited movements. However, more than half of the telephone numbers on the SFA database were either outdated or unavailable, despite calling twice to ensure a better coverage (see Recommendations).

Geographical spread was an important criterion in this sector, ensuring data were collected across the Seychelles, including Praslin, La Digue and the outer islands, allowing both a breakdown across the islands and a comparison between them.[5]

Table 2 shows for each of the stakeholder sub-sectors identified the data collection methods, expected sampling, and actual sampling. The two key methods are interviews in person and

[5] NB: There were no records from the outer islands as after consultation with the IDC it was noted that fishing was only conducted for personal consumption.

telephone with fishers, processors and small bycatch companies. For the government ministries the aim was to have a single interview with a small group where required for each ministry and agency, however this was not possible to organise because of COVID-19 related health concerns. Instead heads of department were contacted to support the process. The shipping agents, chandlers, NGOs, tuna purse seine industry and research groups were sent an electronic questionnaire and where possible this was followed up with an interview over the phone, emails or in person.

The Terms of Reference established some of the standards that we would be required for use in the analysis, i.e. disaggregation of the results of employment by age, sex, nationality and level of educational attainment, and to be able to breakdown other results of the analysis by the main groups of actors in fisheries sector value chains (i.e. the processing, marketing, distribution, provisioning and port services sectors). This therefore required modifications of the questionnaires for each sub-sector so as to be appropriate for the target audience (e.g. you would not ask the same questions to an artisanal fisherman as you would a Government Minister or the manager of a large company).

To ensure completeness of the data collection procedures, we developed a simple key document for data analysis that will provide the basis for database design and development of the analytical functionality (Annex 1). The structure ensured that all data collected were used in the analysis (i.e. resources were not spent collecting data that would not be analysed) and that all data needed for the analyses required were collected (i.e. resources were spent to ensure all the required data were collected). A reference table within the survey database itself was developed to will allow users to identify the source elements of each query and the analysis routines where each data element have been used.

The questionnaires were developed using a standard method as per the following list:

- Agreement with the Project Steering Committee on the information required;
- Define the target respondents, as they be may different for each questionnaire;
- Choose the method(s) of reaching your target respondents in the sector;
- Decide on question content as per requirement of the TOR (i.e. record the information required to be collected);
- Develop the question wording and options (where applicable) for responses;
- Ensure questions are provided meaningful order and format (including tick boxes of five options or box to be completed);
- Check the length and time taken to complete the questionnaire is manageable;
- Test each questionnaire / method;
- Discuss with Project Steering Committee and adjust where necessary; and
- Finalise the survey questionnaires and methods.

The questionnaires underwent a number of iterations following a series of discussions with the Project Steering Committee. The first draft of the questionnaires was submitted on the 25th February 2020. There were three types of questionnaires to address the data collection needs and targeted two groups of the stakeholders. The first is the large group of individual fishers who are mostly self-employed, the second are companies and organisations active in the fisheries sector and the third semi-structured questions to gather information on the wider questions affecting the fisheries sector.

Table 2. Summary of proposed data collection methods and estimated sampling rate by fisheries sub-sector.

Sub-Sector	Data Collection Method(s)	Sampling Rate	Estimated Sample Size	Actual Sampling Size
Commercial Fisher Associations / vessel owners and fishing companies	In-person and telephone survey interview with questionnaire	Target at least 50% of fishers, spread across the geographic range of Seychelles uniformly by number.	750 - 1000	913
Shipping Agents, stevedoring, ship chandlers/net repairs, Engineering.	Electronic questionnaire and follow-up in -person interview	Target 100% - 50% return expected	50%	90%
Fish Food Processors/caterers	In-person survey interview with questionnaire	Target minimum 50%	50% (Processors) 50% (Caterers)	100% 50%
Bycatch Companies	In-person survey interview with questionnaire	Target minimum 100%	2	100%
Government Ministries and Agencies	In-person/electronic survey interview with specific questionnaire	100%	100%	100%
NGOs	Electronic questionnaire and possible follow-up interview	100% - 50% return expected	No specific target	
Representatives of the tuna purse seine fishery	Electronic questionnaire and possible follow-up interview	100% - 50% return expected	Interviewed via agents	
Representatives of the sport fishery	Electronic questionnaire / in-person and possible follow-up interview	100% - 50% return expected	50	Low – No activity
Researchers	Electronic questionnaire and possible follow-up interview	100% - 50% return expected	No specific target	

The questionnaires developed for the two groups for fisher and companies can be found in Annex 2 and Annex 3. Both questionnaires were translated into Creole and were made available to interviewers as and when needed. The semi-structured questionnaire with additional questions for companies and organisations can be found in Annex 4. These questionnaires and interview structures are defined the table definitions described for this database. The timeline of approval of the questionnaires are shown in Table 3. [6]

Table 3. Timeline of the Questionnaire approval by Project Steering Committee.

Questionnaires	Submitted (Draft)	Final Approval (after verification)
Fishers	26/02/2020	02/10/2020
Company	26/02/2020	10/09/2020
Semi-structured	26/02/2020	10/09/2020

Based on the ToR the following broad elements were considered in the development of questionnaires:

- Interviewee details;
- Duration of employment (e.g. fixed, contract);
- Location of activity (e.g. to agreed geospatial areas);
- Accommodation type and location;
- Gender;
- Age (broad standard categories);
- Nationality;
- Highest job-related qualification / school level attained;
- Work pattern – working hours, part-time, fulltime;
- Remuneration (e.g. crew share, agency, corporate);
- Position (job title);
- Industry segment (e.g. fishing, processing, aquaculture, management, policy, legal, services); and
- Demand in skills.

During the review process of the questionnaire a number of additional elements were added in particular to the fishers' questionnaire:

- Pension contribution;
- Insurance contribution;
- Benefits to sick leave;
- Whether a registered fisher or not; and
- Fisher's opinion on how to encourage the young to enter into the sector.

2.1.3 Develop a survey database and methods for data analysis (Task 3)

The survey database developed to collate and maintain the data associated with the project was required to be compatible with existing databases held by the fisheries administration. The survey database was therefore be developed in MS Access to provide compatibility with the current systems used by SFA and the database analysis experience held within SFA.

The database as intended is split into three parts:

1. Data tables;

[6] NB: Due to the delays in stakeholder engagement due to COVID-19 a longer process for approval was possible.

2. Data editing interface access for data editing and viewing; and
3. An analytical database that contains all the SQL (Structured Query Language) queries and analytical routines

In this way, the survey database will provide some degree of future proofing for the potential to move data to a more advanced server-based database management system (e.g. MS SQL Server or, MySQL) but still retaining the simple user interfaces for data entry and analysis. It is noted that the Economic Section of SFA, is already planning to transfer their databases over to a more advanced system as suggested (probably MySQL or PostgreSQL making any transition simpler.

This development style allows test datasets that would produce known response for analysis can also be developed and used to test the analysis routines, whilst data are still being collected. This parallel development and data collection reduces the length of time between the data collection and analysis phases and allows data to be added up until a much later stage than would normally be expected

The database was developed based on the employment surveys and semi-structured interviews developed in section 2.1.2. Standard coding systems that are currently utilised by SFA and appropriate regional and international standards (e.g. ISIC coding for sectoral analysis) were utilised throughout.

The user interface to data collection forms was developed so as to appear as close to the paper forms or electronic interface used to collect the data (i.e. the Android phone app) as they could be in MS Access to provide ease of data entry and editing.

The updated deliverable D2 Technical Report will be provided at the end of the project and submission of the final report. This report should be considered a “live” document and will be updated at the end of the project and will be able to continue to be developed by SFA after the project has completed.

The Technical Report consists of the following elements:

Data Collection Methodology – Summary of all questionnaires and interview methods used to collect the data, including a “map” of questionnaire / interview type and database table.

Database table descriptions and entity-relationship diagram (ERD) – A list of table names and descriptions of all the tables in the database, along with the ERD showing how tables are linked. Detailed table descriptions will be provided as an Annex.

Database queries (SQL definitions and descriptions) – A list of queries, their functional descriptions (i.e. what they do, data used and where they are subsequently used) and the SQL definitions for each query in the database.

Database analysis routines (definition and descriptions) – Description of all analytical routines (both SQL and code based) used in the database, highlighting the tables and queries used.

Outputs for analysis – Identifying outputs for specific analysis from within the database

Standalone data collection manual – A separate manual as an Annex to the main technical report detailing the data collection process and the process of entering data into the database and how to edit existing data.

Standalone data analysis manual – A separate manual as an Annex to the main technical report describing the data analysis routines in the database, their functions, the data they use and the outputs and output formats defined.

In terms of data collection, MRAG has a its own webserver configured with web-based survey software (using Lime Survey) that we use to deliver structured online surveys for collecting data in the field. The design of each of the surveys can be optimised for use with mobile devices such as phones and tablets, enabling data to be collected in the field where a mobile signal exists, or alternatively on paper and entered at a later date when a Wi-Fi or mobile signal is available. This will importantly reduce project implementation costs, by limiting printing to a few backup sheets for when no mobile phone or Internet is available, does not require the purchase of additional laptops or tablets instead relying on and utilising existing hardware and solutions.

Data validation procedures, logical conditions and switches (to enable the easy passage through the survey e.g. avoiding unnecessary sections based on previous responses) have been built in as standard that will assist the data collectors and direct respondents in collection of data will be included in the online survey forms. The data collected will be stored centrally on MRAG's own webserver, so access to data can be made quickly available to the project team, but is restricted only to those authorised persons. The raw data were not made available to anyone in Seychelles to ensure confidentiality of information provided by respondents.

2.1.4 Recruit and train data collection personnel (Task 4)

The data collection phase was a crucial part of the project and the expected quality of the data were largely reliant on the work done by the team of data collectors in the field. This activity presented diverse challenges and the data collectors have to extract this information from the respondent and as is the case for any such data collection programme, a good rapport and understanding of operations on the side of the data collector was crucial to obtain good results.

The approach used was to recruit experienced interviewers who have previously engaged in surveys. The use of the SFA field workers and those with experience from the National Statistical Bureau (NSB) were an added advantage since they have a good understanding of the sector and have undertaken a number of surveys previously. In addition, other interviewers were recruited from e.g. University of Seychelles (students), the Ministry of Employment (those looking for part-time positions) and previous census surveyors. The retention of the data collectors was considered as satisfactory, although during the implementation period a few collectors were not able to continue, especially those that were unemployed during recruitment but then found employment and those engaged in the national work-force survey. As such, midway during the survey a second batch of interviewers were recruited and trained.

Based on the final methodology and as agreed at the inception phase, the number of data collection personnel required was estimated to be between 20 and 30. 0 provides a list of data collectors recruited for the survey.

The work programme was divided into different sub-sectors of the sector as described in Table 2. The processes conducted under this task consisted of two-phase training:

- Lecture-based and hands-on training regarding the purpose, data, and expected outputs of the project was conducted. This was to ensure that all the data collectors were familiar with all the variables and their meaning, the language used and the terms used are well understood. Training and lectures were provided to all data collectors on Mahé, Praslin and La Digue. A second batch of collectors were recruited and trained mid-survey due to the unavailability of a small number of data collectors and to accelerate the level of data collection in areas where progress was slow (**Error! Reference source not found.**).
- During the implementation of the survey, periodic coordination meetings were held with all the data collectors to gauge progress, review constraints and identify solutions to

be discussed with the Project Steering Committee. In addition, three WhatsApp groups were created for data collectors from Mahé, Praslin and La Digue. This provided instant group support to anyone having difficulties or requesting clarification on any of the questions on the questionnaire, especially during the COVID-19 restriction periods. Email and telephone support were also provided. A training YouTube video was also prepared describing how to complete the Company's questionnaire[7] but also provided guidance on different scenarios that data collectors may encounter during field work. The video was distributed to all data collectors via the WhatsApp groups.

- The data collected were entered into the database developed via the Lime survey website. Specific data entry personnel were identified and assigned with data capture where necessary as the data collectors themselves were tasked with all the data entry. Data verification were undertaken periodically to ensure that the information captured was correct and met the required standards, above and beyond standards already defined within the database itself. Returned questionnaires were double checked to highlight any possible mistakes made during data collection.

Table 4. Timeline of different training and physical follow-up sessions conducted

Island	Training sessions	Kick off meeting	Follow-up Sessions 1	Follow-up Sessions 2
Mahé	25/07/2020 & 10/11/2020	19/09/2020	01/11/2020	04/12/2020
Praslin	01/08/2020	01/08/2020	11/09/2020	29/10/2020
La Digue	01/08/2020	01/08/2020	12/09/2020	30/10/2020

2.1.5 Perform a pilot test on the survey and data collection methods and adjust the methods as required (Task 5)

The survey phase consists of tasks 5 and 6 (sections 2.1.5 and 2.1.6) as specified in the ToR, and ran from month 9 to month 13 of the project. There was a six month no cost extension provided to the project due to COVID-19 delays. The Survey ran for an extra month (to month 13) for the following reasons:

- Presidential Elections took place between 22-24 October and data collectors had difficulties undertaking work due to the ongoing political campaigns. Time lost was estimated at around 3 weeks.
- For the semi structured interviews, despite making early contacts with respondents, in particular those in civil service, and because of some expected changes in Government structure, most were non-responsive.
- During Month 13, due to increases in COVID-19 cases locally, Seychelles was subjected to indefinite movement restrictions that further impeded the conclusion of some interviews, in particular the semi structured.
- A number of entities felt that the semi-structured questionnaires were very sector specific, hence had difficult to complete due to lack of knowledge (e.g., Ministry of Education, University of Seychelles.
- Numerous contacts (phone numbers and emails) of businesses were out of date and a number of businesses failed to respond, causing delays in re-connecting with the contacts.

[7] YouTube training video https://youtu.be/eyYoxk0fReI (in Creole)

Past experience of surveys of this type has shown that it has been useful to pilot the questionnaires and the field methods on a small scale. Testing the questionnaire was a way to pinpoint problem areas, reduce measurement errors, reduce respondent burden and determine whether or not respondents are interpreting the questions correctly. This was undertaken after the training session whereby a number data collectors went to the field and interviewed more than 50 test respondents. Some of these interviews were conducted electronically followed by phone calls. This was followed by a debriefing session and review the answers. The Project Steering Committee and the SFA also provided valuable feedback on the design and content of the questionnaire. At the same time the database was tested to ensure compliance and that the all fields were functional.

During this testing phase the following questions were evaluated:

- How long does the questionnaire take to complete?
- Are the instructions for each section clear and unambiguous?
- Do the difference sections flow reasonably from one to the next?
- Are the questions direct and concise?
- Are the questions measuring what they intend to measure?
- Are there questions that makes respondents feel uncomfortable, annoyed or confused. Could be worded differently? and;
- Are the questions free from technical words and jargon?

Following on from this, the questionnaires were revised and submitted for final approval by the Project Steering Committee before implementation. Minor issues were observed in the Fishers' questionnaire whereby the questions were reordered to improve flow, confusion between personal address and base of operations, changes to wages bands and education levels and better clarity to the International Standard Classification of Occupations of 2008 (ISCO-08) codes of the different employment status. For the Companies' questionnaire modifications were made to include a turnover band, expand the operational location, provide more than one industry code of primary activity and as a percentage for each activity. A number of COVID-19 impact questions were also added to take advantage of the survey taking place to gauge the views of industry in relation to the impacts and mitigation of the COVID-19 pandemic in the Seychelles.

These additional COVID-19 related questions were as follows:

- Do you anticipate COVID-19 to have impacted your future employment needs, training and development plans?
- What is the impact (loss/gain/remain unchanged) of COVID-19 be to your earnings / turnover as a percentage of current? (Percentage change e.g. -20%). Describe how this will affect your company over the next few years (what aspects of the business etc.)?
- Have the adaptive measures produced by the Ministry of Employment such as the new Gainful Occupation Permit (GOP)[8] framework and other employment programs (Unemployment Relief Scheme (URS), My First Job Scheme (MFJ) and skills Development Programme (SDP) mitigated some of the negative effects of COVID-19 on the workforce?
- Has the Fisheries Emergency Plan produced by the Fisheries Department reduced the negative impacts caused by COVID-19?
- Did Covid-19 affect the productivity of your employees?

[8] http://www.ics.gov.sc/permits/gainful-occupation-permit

2.1.6 Carry out the survey according to the survey plan (Task 6)

The survey implementation was conducted as per the sampling strategy and timeframe agreed during the inception phase and the subsequent no cost extension provided during to COVID-19. The tasks included:

- Undertake the survey within the set time period;
- Data entry;
- Data validation and verification; and
- Complete the final project database.

During the survey period, regular updates from the data collection team were collated and were summarised in the monthly project reports and project weekly meetings as the project neared completion. The Team Leader in Seychelles and the rest of the project team in London were available to answer any questions that arose during the survey either from the respondents or the survey team themselves. In addition, the follow-up sessions were held to ensure there was adequate feedback, clarification and opportunity to address any shortcomings in the survey.

The data collectors were allocated districts or zones based on their home residence and also their familiarity with the different districts. The SFA Field Research Officers were allocated according to the landing sites allocated for official duties. This facilitated their access to the vessel owners and fishers in those areas to undertake the survey. For the other industry groups such as processing plants and shipping / port agencies, specific data collectors were allocated. Similarly, the same was done for specific areas of development such as the industrial zones; Providence Zone 6, Providence Industrial and Perseverance Industrial Area. The sports fishing sub-sector and caterers were allocated to a specific observer. On Praslin and La Digue each of the data collectors were given a specific district / area to cover.

All data were entered and verified through the MRAG dedicated survey server using Lime Survey as the driving software. The fishers' data were entered via a phone app. This allowed for multiple surveys to dedicated stakeholder groups. Surveys could be completed online when mobile Internet or Wi-Fi were available, if paper copies were used these were entered at a later date. Data collectors often preferred to collect the data on paper and upload the results at a later stage. It should be noted that with certain stakeholder groups this is also seen as reassuring as they can see their views physically being taken down and electronic means are often not considered with the same level of trust and engagement.

The survey implementation was undertaken as per the sampling strategy, though the impacts of the COVID-19 pandemic meant that the data collection period was longer than expected. During the survey a total of 695 companies, organisations and 557 individual fishers were sampled covering a total of 5282 individual employees. A total of 29 semi-structured in-depth interviews were conducted (Table 5).

A number of difficulties were encountered by the data collectors and these can be summarised as follows:

- Some large companies and government agencies did not respond for both the companies and semi-structured in-depth interview questionnaire despite numerous contacts. The data collectors found it difficult to get feedback despite having made the initial contact. Most indicated they will get back to the data collection team but never did. This led to low returns in some categories such as "Educational Bodies" and "Government".
- Both Employment department and Ministry of Education (at the PS level) were contacted by our surveyors to complete semi-structured interviews. but no response was forthcoming. The Employment department was contacted initially to provide

Employment data and we were referred to NSB who publish quarterly employment surveys.

- A number of respondents indicated that the survey did apply to them since they are not directly involved in the fishing sector.
- For larger companies of over 100 staff, they found it extremely time consuming to provide the data, e.g., age, educational level, years with company. Most of these companies did not have employee databases and had to revert to records kept on file.
- Many did not want to provide their annual turn-over and wage data.
- Most fishing boat owners had difficult to provide specific data on their respect crew.
- A number of business identified as fisheries investment were actually undertaking other activities other than those specified by the data provided by the agency (IEA). Most refused to participate.
- A few businesses refused to provide data because of fear of taxation and making aware their activities to the authorities.
- The sport fishery sub-sector was a difficult group to interview. Since most of the vessels inactive because of COVID-19 (low tourist numbers), many responded as currently not active, in the process of selling their boat or concerned that SFA was collecting information in relation to FA4JR COVID-19 assistance programme.

Table 5. Semi-Structured Interview Respondents by Stakeholder groups.

Stakeholder Groups	No. of Targeted Respondents	Actual Respondents	% of Respondents
Shipping Agent/ Chandler/Net Repairs	8	5	62%
Government	8	3	37%
Parastatal	7	7	100%
Processing Companies	9	7	77%
Fishing Companies	5	2	40%
NGOs	3	2	66%
Educational Bodies	7	2	28%
Financial Institution	3	1	33%

It should be noted that the project did not only count the number of employees within each company but at the same time gathered significant data on the demographics of the employees within each company and sector. The project was therefore a sampling based approach rather than a census. For example for the agencies and fishing companies we attempted to cover 100% of the companies, though as can be seen in Table 5 only 62% (5/8) of the shipping agents / chandlers / net repair companies responded and therefore differences with other surveys undertaken may exist. Similarly, some of the stakeholder groups most distant from the fisheries sector such as the educational bodies and financial institutions have very low responses. The recent blue economy study estimated many values for the harvest sector that differ from this report e.g. for industrial fisheries crew.

3 Analysis

This section addresses tasks 7-13 as outlined in the Terms of Reference.

Here we also identify links between our findings and the challenges identified in Vision 2033[9].

Three of these challenges clearly overlap with the objectives of this study:

(i) Managing migrant labour and the requirements for additional labour and the impacts that come with this influx of people;
(ii) Quality of education and how the Seychelles' education system needs to adapt to ensure the highly educated workforce is supplied with new recruits to meet the demands of an increasingly demanding fisheries sector; and
(iii) Conservation balance, where fishing although a critically important economic sector for the Seychelles has a key role in local ecosystems and a balance between economic exploitation and conservation and environmental protection needs to be maintained.

3.1 Summary of Data Collected

This section provides a simple introduction to the data collected during the study. These data have then been analysed to answer a set of specific questions. It should be noted that additional data were requested to be added and analysed with respect to the impacts of COVID-19 as well as a series of short questions related to pension contributions, insurance, sick leave benefits and registration that were to be collected and summarised but fall outside the main objectives of this study.

In total, data on 5,282 stakeholders in the fisheries sector were collected during this study across 17 sub-sectors (Table 6). Marine Fishing sub-sector (0311) was divided into further subdivisions to better reflect the diversity of the Seychelles fisheries sector:

Table 6 Summary of Respondents Grouped by Sub-Sector (ISIC Code).

ISICCODE	Description	Number
0311	Marine fishing	120
0311A	Marine fishing - Purse seine	17
0311B	Marine fishing – Longline	106
0311C	Marine fishing - Semi-industrial	132
0311D	Marine fishing – Artisanal	1,278
0311E1	Marine fishing - Sea Cucumbers – Invertebrates	78
0311E3	Marine fishing - Lobster – Invertebrates	6
0311E4	Marine fishing - Octopus - Invertebrates	34
0311E5	Marine fishing - Other Invertebrates	12
0321	Marine aquaculture	5
1020	Processing and preserving of fish, crustaceans and molluscs	1,739
1040	Manufacture of vegetable and animal oils and fats	9
3011	Building of ships and floating structures	9

[9] http://www.finance.gov.sc/uploads/files/Vision_2033.pdf

ISICCODE	Description	Number
3012	Building of pleasure and sporting boats	31
3312	Repair of machinery	17
3315	Repair of transport equipment, except motor vehicles	10
3320	Installation of industrial machinery and equipment	1
4721	Retail sale of food in specialized stores	32
4763	Retail sale of sporting equipment in specialized stores	8
5011	Sea and coastal passenger water transport	122
5012	Sea and coastal freight water transport	25
5222	Service activities incidental to water transportation	1,072
5224	Cargo handling	49
5610	Restaurants and mobile food service activities	17
6419	Other monetary intermediation	5
7490	Other professional, scientific and technical activities n.e.c.	276
8411	General public administration activities	41
9329	Other amusement and recreation activities n.e.c.	1
9411	Activities of business and employers membership organizations	20
9900	Activities of extraterritorial organizations and bodies	10

From the total interviewed, 4,716 stakeholders were related to a company in the fisheries sector and 566 individual fishers. Whilst individual company names have been collected in the datasets, they are not referenced in this document unless specific permission has been obtained from those companies.

The following specific questions were asked of the study:

- Analyse the data to assess the level of employment and average earnings in the fisheries and fishery-related sectors (Task 7)
- Determine the proportion of foreign and non-foreign workers for the different fisheries and fishery-related activities of the sector and provide short and mid-term projections of capacity issues through human capacity modelling (Task 8)
- Identify the main labour and gender issues for the different components of the sector, including those stemming from increases in foreign labour (Task 9)
- Identify challenges and solutions for domestic and foreign labour recruitment to the fisheries sector and related activities (Task 10)
- Examine any trend in employment by comparing the survey results with previous surveys undertaken (Task 11)
- Determine the human capacity needs of the different fisheries and fishery-related activities based on trends and anticipated developments (Task 12)
- Make recommendations and identify approaches for the systematic collection of employment data in the sector (Task 13)
- Additionally questions were added as noted above relating to the Impact of COVID-19 on the Seychelles fisheries sector including the impact of COVID-19 on business, the effectiveness of government responses and related impacts on productivity.

3.2 Analyse the data to assess the level of employment and average earnings in the fisheries and fishery-related sectors (Task 7)

The analysis presents an assessment of the level of employment in two ways:

1. Number of individuals reported working in each sub-sector related to the fishing industry, and
2. Full-time equivalency (FTE)[10] i.e. two people working 50% of the time equates to one person working full time.

Earnings (or wages) in each fisheries related sub-sector are assessed based on standard ISIC classifications. We compare the results between fisheries sub-sectors (e.g. industrial longline and purse seine, semi-industrial longline, artisanal fisheries) and between other non-fishing sectors, including other sectors where information is available for the Seychelles (e.g. comparison to agriculture and tourism).

We have used a standard data frame for earnings (or wage 'bands') appropriate to the Seychelles (and agreed with the Project Steering Committee in advance) but with sufficient variation to allow descriptive and visual representations to be meaningful. This enables comparisons to be made but due to the irregular size of the categories and wide ranges estimates of mean and standard deviation for wages would not be possible or appropriate statistically.

We also present the analysis across multiple dimensions examining the critical factors in wages across the entire fisheries sector. This uses a standard key for graphical outputs using a subset of the major represented ISIC groups in Table 6 (see Table 7).

Table 7. Standard key for graphical outputs.

Group	ISIC Code	ISIC Group Description
Fishing	0311	Marine fishing
	0311B	Marine fishing - Longline
	0311C	Marine fishing - Semi-industrial
	0311D	Marine fishing - Artisanal
	0311E1	Marine fishing - Sea Cucumbers - Invertebrates
	0311E4	Marine fishing - Octopus - Invertebrates
	0321	Marine aquaculture
Non-fishing	1020	Processing and preserving of fish, crustaceans and molluscs
	3011	Building of ships and floating structures
	4721	Retail sale of food in specialized stores
	5011	Sea and coastal passenger water transport
	5012	Sea and coastal freight water transport
	5222	Service activities incidental to land transportation
	5610	Restaurants and mobile food service activities
	8411	General public administration activities

NB: These represent the main industrial classification groups indicated in the analysis and are not an exhaustive list of all groups identified during the project,

[10] FTE or full time equivalency is simply calculated as the proportion of a full time working person, when calculating for a group these proportions can simply be added for all individuals to give the number of full time equivalent people this would represent.

Although a detailed breakdown of the 0311 “Marine Fishing” class was possible for some workers, this was not possible for all. It is recommended, that in future surveys a more detailed breakdown of what sub-sectors individual fishers operate in and approximate proportions of time in each is recorded to give a more detailed analysis. In the absence of such an understanding though the recording of the fishers as 0311 “Marine Fishing” at least places them in this higher category.

3.2.1 Number of FT and PT (with proportion) workers by fishery sub-sector and for the sector overall

The overall fisheries sector is predominantly composed of full time workers (3,333 out of a total workforce of 3,925, equivalent to 84.9%), as are the fisher (1,053 out of 1,380 76.1%) and non-fisher (1,280 out of 1,582 80.9%) sub-sectors (Figure 1A shows the proportion of part-time workers, further details available within Table 16).

Within the ‘fisher’ sub-sector there is substantial variability in the proportions of full time and part time workers between ISIC categories (Table 17, Figure 1B). Notably, the level of part time workers is high in 0311 – “Marine Fishing” (58.8%), 0311E4 – “Marine Fishing Octopus” (73.5%), and 0321 – “Marine Aquaculture” (70.0%). For both 0311 – “Marine Fishing” and 0311E4 – “Marine Fishing Octopus”, both full time and part time workers included permanent, short-term and casual employees, and employers / business owners with no clear delineation. In the case of 0321 – “Marine Aquaculture”, the sample size was low (5 respondents) and was composed entirely of employers / business owners who worked full time, and part time workers were short-term and casual employees.

Within the ‘non-fisher’ sub-sector there is substantial variability in the proportion of full time and part time workers between ISIC categories (Table 17, Figure 1B). Specifically, part time workers accounted for all of those sampled from the 9329 – “Other Amusement and Recreation Activities Not Elsewhere Classified” (100% part time). Part time workers were relatively high in 3011 – “Building of Ships and Floating Structures” (22.2%), 5011 - “Sea and Coastal Passenger Water Transport “(22.1%), and 5222 – “Service Activities Incidental to Water Transportation” (25.8%). For 3011 – “Building of Ships and Floating Structures” the sample size was low in terms of absolute numbers, with only 9 respondents, but this represents a large proportion of the local industry with part time workers composed short-term and casual employees and those self-employed workers. For 5011 – “Sea and Coastal Passenger Water Transport” part time workers were primarily short-term and casual employees. For 5222 “Service Activities Incidental to Water Transportation” part time workers a large number did not declare their employment status, those that did were a mixed of short-term or casual, permanent of fixed-term employees.

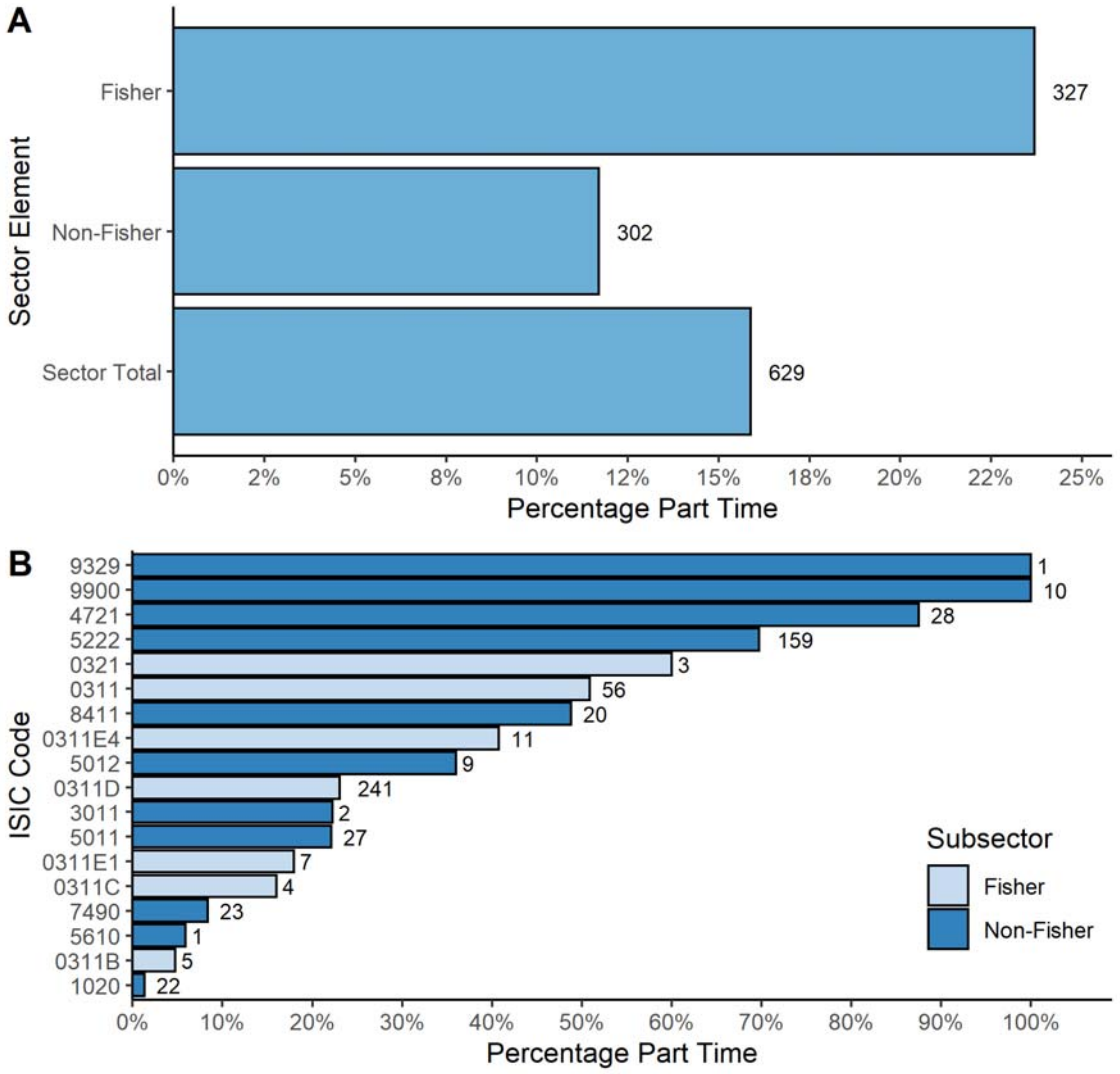

Figure 1. Percentage of part time workers by sector, sub-sector and ISIC code, number of individual part time workers is indicated for each category

3.2.2 Distribution of wages for workers in each fishery sub-sector and the sector overall

The wage data available in this study is in the form of wage bands, selected to align with those already in use in the Seychelles. The distribution of wages in the fisheries sector is relatively uniform across the prescribed wage bands, with the exception of > 83,000 SCR/month, which few workers earn. There is, however, a substantial difference between the fisher and non-fisher sub-sectors, whereby the non-fisher sector has a distinctly bimodal distribution across the prescribed wage bands. For example, a larger proportion of non-fisher workers are found in both the lowest (< 5,805 SCR/month) and highest (15,001 - 35,666, 35,667 - 83,000 and > 83,000 SCR/month) wage bands, relative to the fisher sector, which peaks in the 5,805 - 8,555 SCR/month wage band with no workers earning > 83,000 SCR/month (Figure 2 and Table 18). This bimodal distribution likely reflects the greater variability of both job types and job sector in this category, among which wage structures will likely vary widely.

Within the fishers' sub-sector the ISIC codes 0311 – "Marine Fishing" and 0321 – "Marine Aquaculture" are dominated by lower paid workers. Wages are highest in those sub-sectors

that require specialist knowledge and may bring in expertise from foreign nationals. These include 0311B – "Marine Fishing Longline", 0311E1 – "Marine Fishing Sea Cucumber", and 0311E3 – "Marine Fishing Lobster" (Table 19, Figure 27A).

Within the non-fishers sub-sector, the ISIC codes 9411 – "Activities of Business and Employers Membership Organizations", 5222 – "Service Activities Incidental to Water Transportation" (which has relatively high levels of part-time workers), and 3011 – "Building of Ships and Floating Structures" are dominated by lower paid workers. Wages are highest in 3012 – "Building of Pleasure and Sports Boats", 5011 – "Sea and Coastal Passenger Water Transport "(which has relatively high levels of part-time workers), 5224 – "Cargo Handling, 7490 – "Other Professional, Scientific And Technical Activities Not Elsewhere Classified", and 9900 – "Activities Of Extraterritorial Organizations And Bodies" (despite being part-time dominated) (Table 19, Figure 27B).

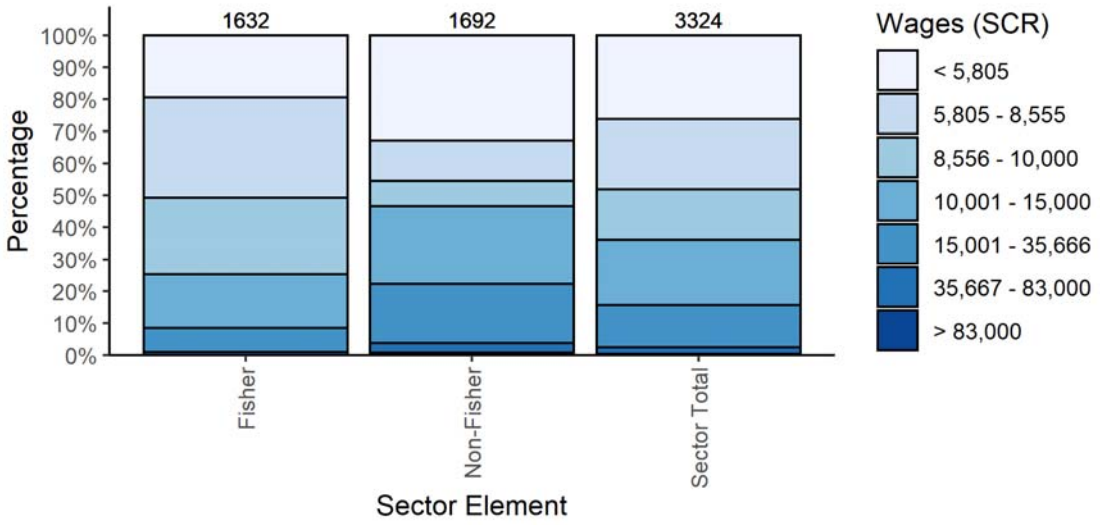

Figure 2 Distribution of wages (SCR per month) for workers in each fishery sub-sector and the sector overall.

3.2.3 Distribution of FT wages for workers in each fishery sub-sector by nationality

The distribution of wages in the fisheries sector for Seychellois and foreign nationals appears to differ. Across the sector as a whole, workers of Seychellois nationality are distributed within lower wage bands at proportionately greater levels that is seen for foreign nationals, however, at high wage bands (35,667 – 83,000 and > 83,000 SCR/month) the relative proportions are similar for both Seychellois and foreign workers. For the fisher sub-sector there is a clear difference in the distribution of wages between Seychellois and Foreign nationals, with Seychellois workers being distributed toward lower wage bands relative to foreign workers. For non-fishers the distribution across wage bands appears relatively similar but foreign workers appear relatively more commonly in the highest wage band (> 83,000 SCR/month) (Figure 3). This may be for a number of reasons including non-Seychellois managers brought in for their experience outside of the Seychelles, or owners of companies in the highest positions, both then being paid higher than other staff. It has also been suggested that these individuals may be paid in currencies other than Seychelles Rupees and this may have an impact on their final salary and hence create a pay gap.

Within the fisher sub-sector the only notable difference in wage bands between Seychellois and foreign nationals are Seychellois nationals being distributed more commonly in higher wage brackets relative to foreign nationals in 0311B – "Marine Fishing Longline". However, foreign workers are rare, or not found, in 0311 – "Marine Fishing" and 0311D – "Marine Fishing Artisanal "which comprise the majority of the lowest paid workers (Figure 28). The Gainful Occupation Permit (GOP)[11] that is required for employment of foreign workers in the Seychelles including the 0311D – "Marine fishing Artisanal" sector which explains this. Low numbers of foreign workers, or none at all, are present in many ISIC codes which precludes further interpretation of potential differences. One fishing sector that is different from the normal pattern is for the sea cucumber fishery (0311E1) which displays a higher than normal spread of wages due to the skill requirements and high value of this fishery.

Within the non-fisher sub-sector low levels of foreign national workers mean that interpretation of differences among nationalities with regard to wage band is unlikely to be robust. The highest wage bands (> 83,000 SCR/month) are mostly composed of high ranking administrators or owners of businesses for all ISIC codes when the International Classification of Status in Employment (ICSE) status is considered. It is notable that Seychellois workers in the highest wage band are found in 1020 – "Processing and Preserving of Fish, Crustaceans and Molluscs", and 5011 – "Sea and Coastal Passenger Water Transport". Conversely, foreign workers at the highest wage band are seen in 5224 – "Cargo Handling" and 7490 – "Other Professional, Scientific and Technical Activities Not Elsewhere Classified" (Figure 29). Low numbers of foreign workers, or none at all, are present in many ISIC codes which precludes further interpretation of potential differences.

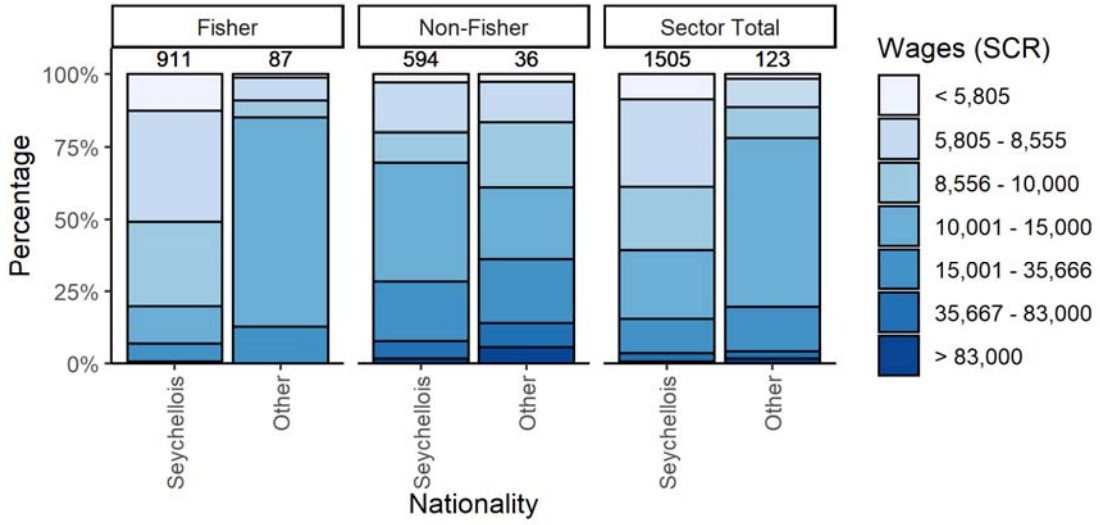

Figure 3. Distribution of full-time (FT) employee wages (SCR/month) for fishers and non-fishers by nationality

3.2.4 Distribution of FT wages for workers in each fishery sub-sector by gender

The distribution of wages in the fisheries sector for female and male employees appears to differ. As is the case in many sectors at the global level male workers are found more commonly in both the lowest (< 5,805 SCR/month) and highest (> 83,000 SCR/month) wage

[11] http://www.ics.gov.sc/permits/gainful-occupation-permit

bands that their female counter parts. This holds true for both fisher and non-fisher sub-sectors, although female representation in the fisher sub-sector is very low (Figure 4).

Within the fisher sub-sector, in the few instances of female employment, female workers tend towards higher wage bands that their male counterparts (Figure 30). However, low numbers of female workers in the fishers' sub-sector mean that interpretation of differences are unlikely to be robust.

Within the non-fisher sub-sector female and male distribution across wage bands in broadly similar. Male workers are generally more prevalent in both the lowest (< 5,805 SCR/month) and highest (> 83,000 SCR/month) wage bands. Although this may suggest gender pay inequality at both the upper and lower bands, it is more likely a result of there being clear male gender dominance in these bands, i.e. there are more men in these particular sectors and therefore men would be far more likely to fall into each wage category. This would not preclude a discriminatory pay structure (particularly at higher bands) but the data available would not support its existence either. This pattern is clearest in 1020 – "Processing and Preserving of Fish, Crustaceans and Molluscs", 5222 – "Service Activities Incidental to Water Transportation", 5224 – "Cargo Handling", 5610 – "Restaurants and Mobile Food Service Activities", and 7490 – "Other Professional, Scientific and Technical Activities "Not Elsewhere Classified" (Figure 31). Low representation of female workers across a number of ISIC codes limits further interpretation.

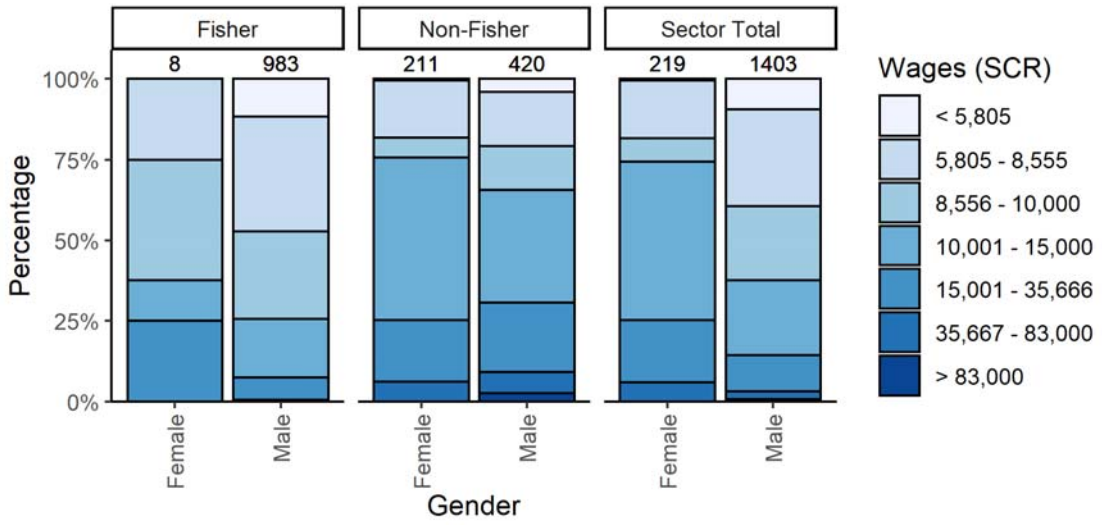

Figure 4. Distribution of full-time (FT) employee wages (SCR/month) for fishers and non-fishers by gender

3.2.5 Distribution of FT wages for workers in each fishery sub-sector by age

The distribution of wages in the fisheries sector across age brackets is variable. Generally, the distribution of wage band shifts towards higher brackets in older age groups, as might be expected with increasing experience in the sector (Figure 5).

Within the fisher sub-sector this trend generally holds true, however, there is a notable increase in the distribution of workers at moderate wage bands (10,001 – 15,000 SCR/month) in the 18-24 year old age band (Figure 5). These 18-24 year old workers are mainly those operating in 0311B – "Marine Fishing Longline", an area in which workers in older wage bands are few in number, and may reflect a high demand for workers in this area coupled with a high value fishery.

Within the non-fisher sub-sector the shift in wage bands with increasing age is less prominent, with the proportion of lowest paid workers (< 5,805 and 5,806 – 8,555 SCR/month) remaining stable across age bands (Figure 5). Shifts towards higher wage bands are seen the in non-fisher sector, though the consistency of this pattern is somewhat volatile across differing ISIC codes.

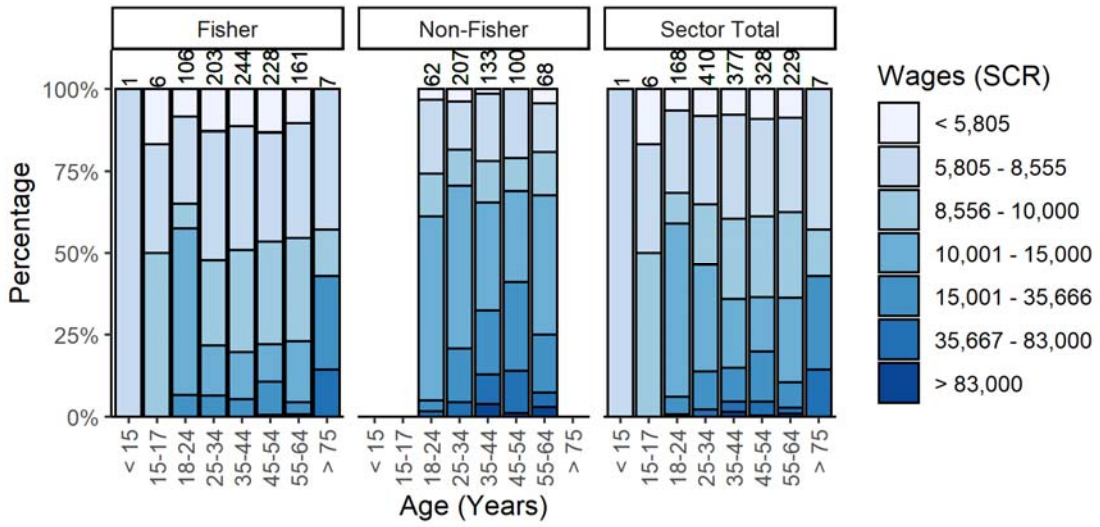

Figure 5. Distribution of full-time (FT) employee wages (SCR/month) for fishers and non-fishers by age.

3.3 Determine the proportion of foreign and non-foreign workers for the different fisheries and fishery-related activities of the sector and provide short and mid-term projections of capacity issues through human capacity modelling (Task 8)

As part of the data collection process nationality data were collected for all persons interviewed (fishers) and for whom data were provided by employers. As each person and employer (if not self-employed) were linked to a particular ISIC sub-sector along with an estimate of their full-time equivalency (FTE). This enabled the calculation of the following indicators:

- Proportion of workforce (number of individuals) of Seychellois nationality;
- Proportion of workforce (number of individuals) not of Seychellois nationality;
- Proportion of workforce (FTE) of Seychellois nationality; and
- Proportion of workforce (FTE) not of Seychellois nationality.

These were than able to be broken down further by sub-sector for key sub-sectors, (e.g. fishing / non-fishing and by ISIC sub-sector processing, management).

Figure 6A provides the simplest view of nationality broken down between fishing and non-fishing sub-sectors and between Seychellois and foreign nationals. This shows that for the ISIC fishing sub-sectors combined (codes starting 03) that less than 10% of the fishers are non-Seychellois. When we look at the fishing sub-sectors in detail (Figure 6B) we can see that the main block of foreign fishers appears in the 0311A – “Marine Fishing – Purse Seine”, 0311B – “Marine Fishing – Longline” and 0311C Marine Fishing - Semi-industrial Fisheries” including 0311E “Marine fishing - Sea cucumber fishery”. Here the foreign workers are typically skilled fishermen working in these sectors when local trained Seychellois are not available but also reflect the issue of drug use, reliability and dependability of local Seychellois fishery worker. The artisanal sector (0311D) by contrast has only 10 foreign fishers out of 1,278 sampled i.e. only 0.78%. This is explained by the fact that there are regulations in place that restricts employment of foreign labour in this sub-sector. The large numbers of foreign workers in the non-fishing sub-sectors represent the large numbers of workers brought in to work in the processing and associated sub-sectors (see Figure 7).

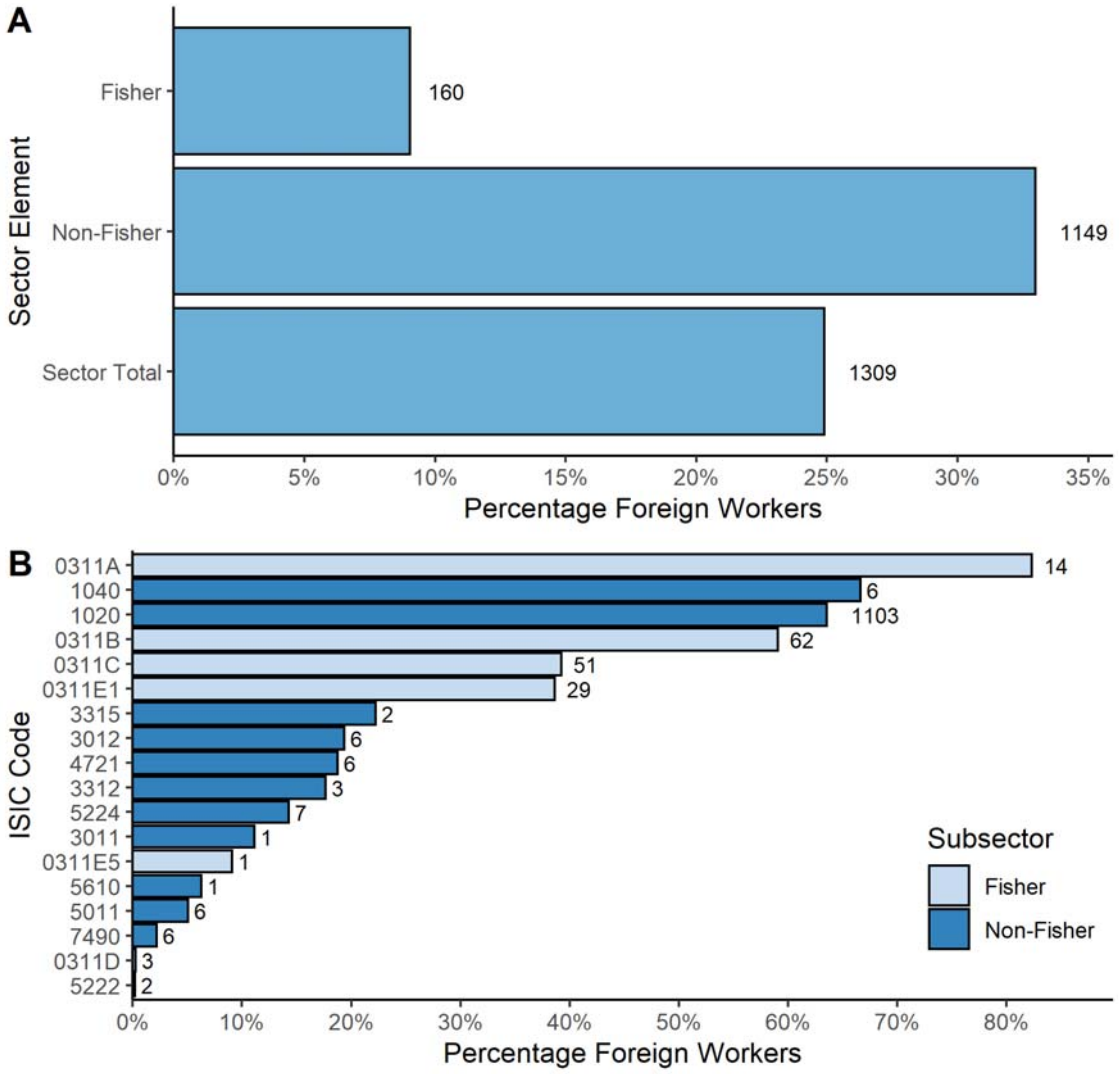

Figure 6. Percentage of workforce (number of individuals) by sector, sub-sector and ISIC code not of Seychellois nationality

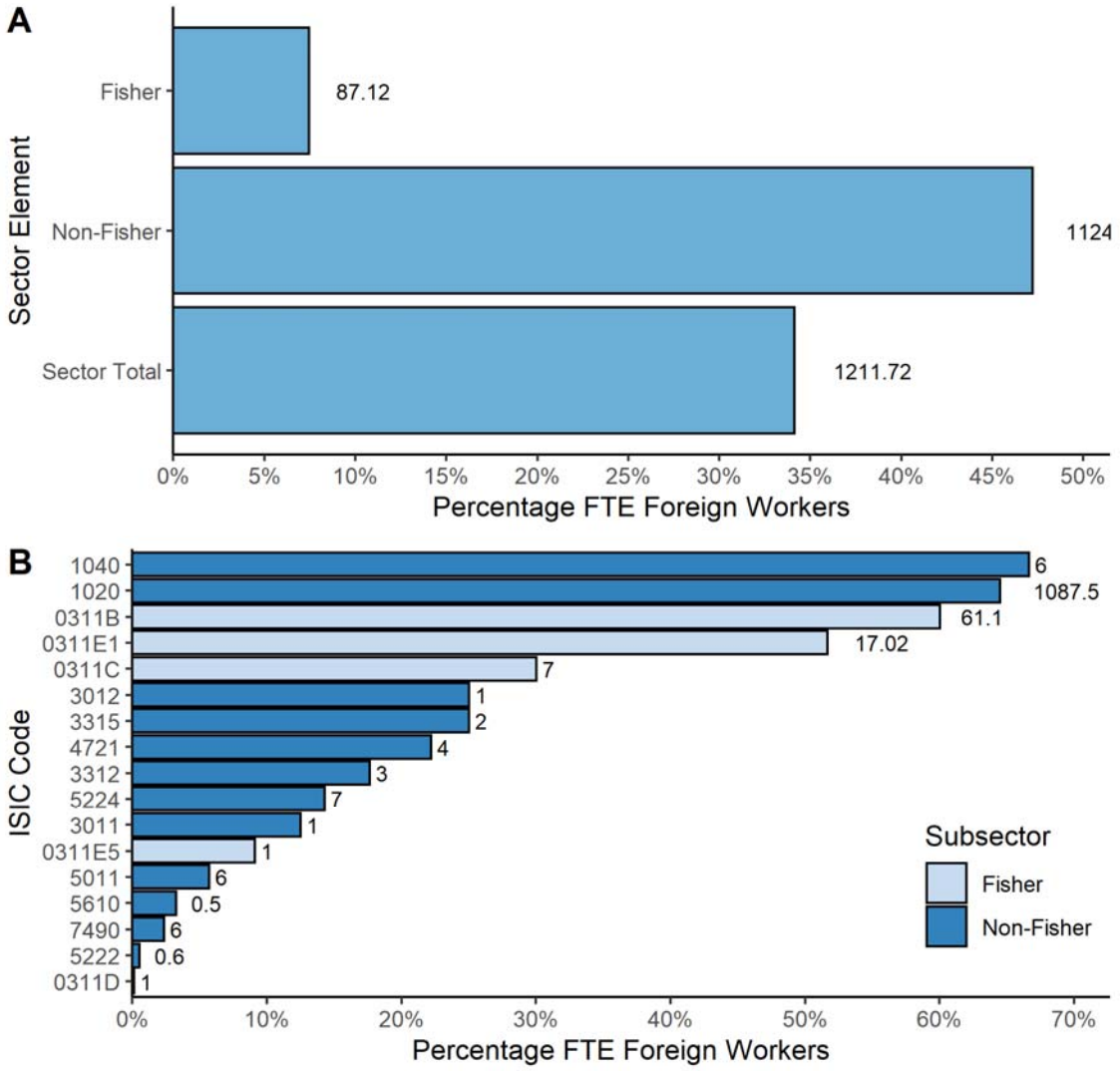

Figure 7. Percentage of workforce (FTE) by fishery sub-sector of Seychellois and not of Seychellois nationality

3.4 Analysis by Occupation

When we look at the breakdown of the sector by occupation (i.e. ISCO code) it is clear that employment in the sector is dominated by two main categories at the top level, “6. Skilled agricultural, forestry and fishery workers” and “9. Elementary occupations”, followed by “3. Technicians and associate professionals” (see Table 8 & Figure 8). These three categories are further broken down in Figure 34, Figure 35 and Figure 36 respectively.

It is clear from Figure 34 that employment is dominated by fishers in the artisanal sector with only a small proportion classifying themselves as deep-sea fishery workers, though a significant number declare themselves as subsistence fishers.

Figure 35 clearly shows that all the workers under this grouping are generic labourers. It is probable that the distinction between the three main categories in the Seychelles is minimal

and movement between the three categories could be quite flexible (933 Transport and Storage, 921 Agricultural, forestry and fisheries labourers and 922 Manufacturing labourers).

Figure 36 shows a wide variety of technical roles in the sector. The largest are the supervisory roles (312) and notably, referencing the importance of SFA and other NGOs in the sector and the number of technical workers involved in the sector ISCO codes 314 and 335 (314 - Life science technicians and related associate professionals and 335 Regulatory government associate professionals) It is important to understand the key role that these technical roles play in supporting the rest of the fisheries sector.

Table 8. Breakdown of sector by ISCO occupation codes (Level 1)

ISCO Level 1	Number
1. Managers	226
2. Professionals	239
3. Technicians and associate professionals	436
4. Clerical support workers	142
5. Service and sales workers	124
6. Skilled agricultural, forestry and fishery workers	1,838
7. Craft and related trades workers	246
8. Plant and machine operators, and assemblers	282
9. Elementary occupations	1,437
10. Armed forces occupations	1
99 Not elsewhere included (nei)	9

It should be noted that due to the COVID-19 pandemic, one sector that is under-represented in this study was the sports fishery. This does not reflect the work done by the data collection team as the sports fishing business were contacted by the data collectors during the stakeholder engagement phase. Based on the list of the business provided by the Ministry responsible of Tourism, 95% of all the business were called by phone and followed up with email communications. A small number of email addresses were outdated and similarly telephones numbers. The problem with this sector was that the frequent feedback received was that they are “no longer operating”, “no longer involved in the business”, or have “sold their boat” during the COVID-19 pandemic when their business opportunities just did not exist. Most of those contacted declined to provide any further information or simply because the contacts available were office addresses, emails or phone numbers, the majority were closed and data collectors were unable to make contact.

Overall, a total of 93 different occupations according to the standard ISCO classification were recorded within the Seychelles sector, crossing all ten major occupation groups. A detailed summary of the number of respondents by ISOC code (level 3) can be found in Annex 7.

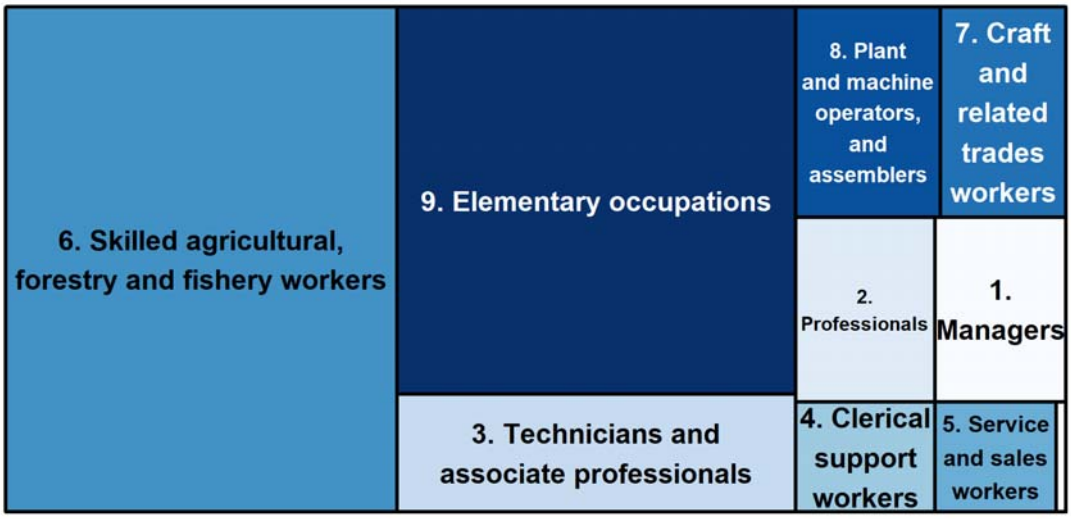

Figure 8. Breakdown of occupations reported by ISCO category (top-level).

NB: Size of the rectangles is proportional to the number of individuals reported.

3.5 Analysis of Education

The overall fisheries sector contains workers with a wide range of educational backgrounds, though generally education within the fisheries sector represents an expected pattern. Only a small percentage of Seychellois, 14.7% (excluding null responses), of the workforce have not been educated beyond secondary education (see Figure 9). These are mostly male and over 45 years of age (81%), reflecting the increase in education levels in Seychelles over the past 30 years which has resulted in the Seychelles having the best education system in Africa and in the top 50 worldwide, resulting in a better educated younger population than the generations before them. There is little gender bias, with women in the sector generally being better educated than their male counterparts.

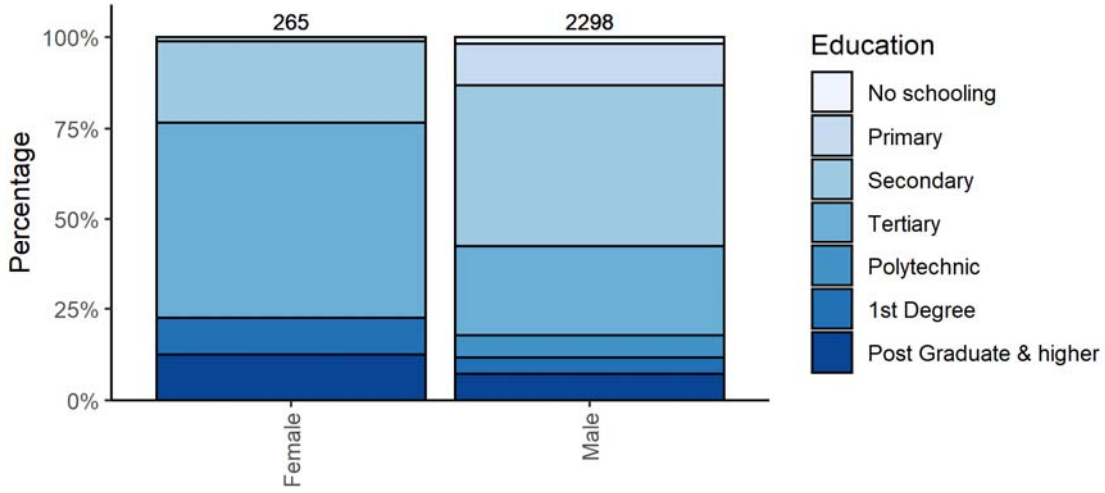

Figure 9. Education level bands reported by gender.

Patterns between Seychellois and foreign workers are again very similar in terms of the proportions observed by education band, with approximately 20% above tertiary education for the Seychelles workforce and slightly over 10% of the foreign workforce. The foreign workers (where numbers by nationality allow analysis) typically of further than tertiary education are Filipino and Sri Lankan. This is understandable as we would expect people of a particular education level to fill a particular role in the sector (See Figure 10).

These data can be analysed by looking at the education levels across each sub-sector (again broken down by fishing and non-fishing, Figure 10) and by each sub-sector (see Figure 11Figure 10) and looking at the same education level data based on the ISCO occupation code data submitted for each individual across sub-sectors to look at the education levels "required" for each individual occupation.

The non-fisher sub-sector has a substantially larger proportion of workers who have attained Tertiary or above education (69.5%), relative to the fisher sub-sector (36.0%, (see Figure 11). Among those ISIC categories with sample sizes >50 individuals, there appears to be higher levels of education in 0311 – "Marine Fishing" and 0311B – "Marine Fishing - Longline", compared to 0311C – "Marine fishing - Semi-industrial", 0311D – "Marine Fishing - Artisanal", and 0311E1 – "Marine fishing - Invertebrates- Sea Cucumber" shows a bias towards the higher education bands for the transport sector (5011 & 5012) and "General public administration activities" (8411) and "Activities of extraterritorial organizations and bodies" (9900) with the stevedores (5224) and the boat building and repair sub-sector (3011/3012) having the lowest education levels, though the vocational education and skills of the boat building and repair are often of a high standard though they have been educated through apprenticeships and vocational on the job training rather than "traditional" school and college based education. The higher salaries earned by stevedores appear to attract workers from all education levels drawing in many workers with a good education who appear to prefer to work in this sub-sector given the higher wages and freedom over working arrangements. Given the number of education level categories, the sample sizes from other ISIC codes are generally too low to draw much inference. Education levels in the non-fisher sub-sector are highly variable among ISIC categories, but generally higher than most fisheries sub-sector categories.

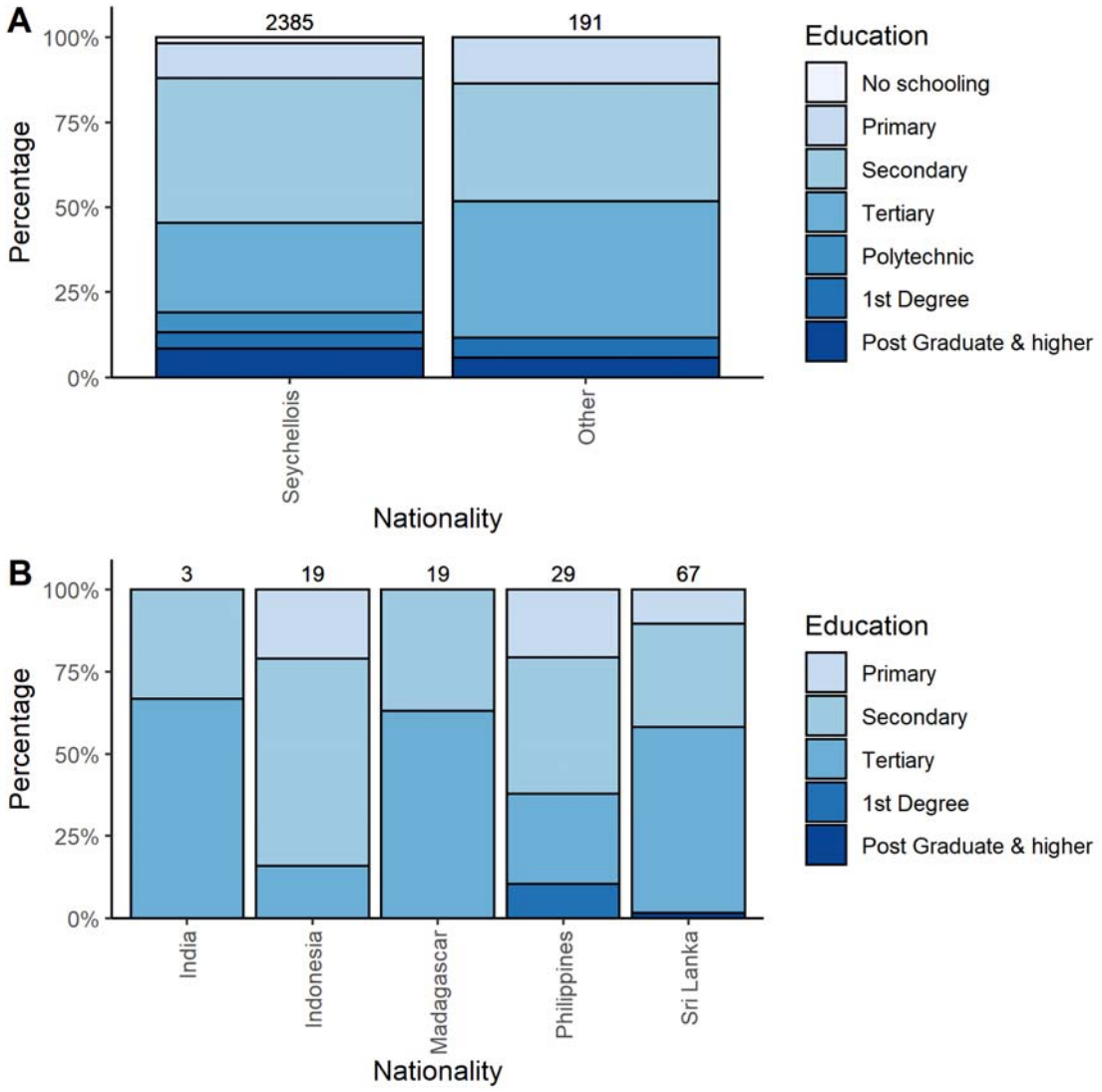

Figure 10. Education level bands reported by nationality (A Fishing and B Non-Fishing).

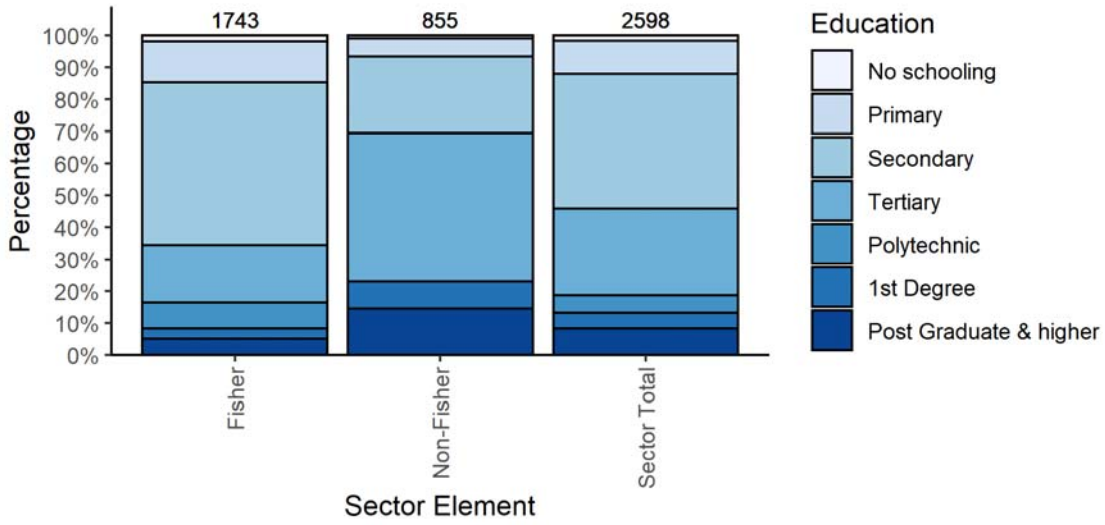

Figure 11. Education level bands reported by fisher and non-fisher sub-sectors.

When the data are analysed against occupation codes (outlined in Table 9), the roles that exhibit a high proportion of higher education (above tertiary), the expected management and professional or technical roles are clearly highlighted (see Figure 12). Clerks and sales workers show the largest bias towards the lesser educated members of the workforce. Some of the surprising results show the relative high proportions of post-tertiary educated workers in the occupations recorded as “62 Market-oriented skilled forestry, fishery and hunting workers”, “63 Subsistence farmers, fishers, hunters and gatherers”, “93 Labourers in mining, construction, manufacturing and transport “and “94 Food preparation assistants”. The latter two are low in numbers but there are a clear number of highly educated fishers in the sector which is surprising when there are a number of workers, recorded to be educated to first or post-graduate degree level working as subsistence fishers in the Seychelles fisheries sector.

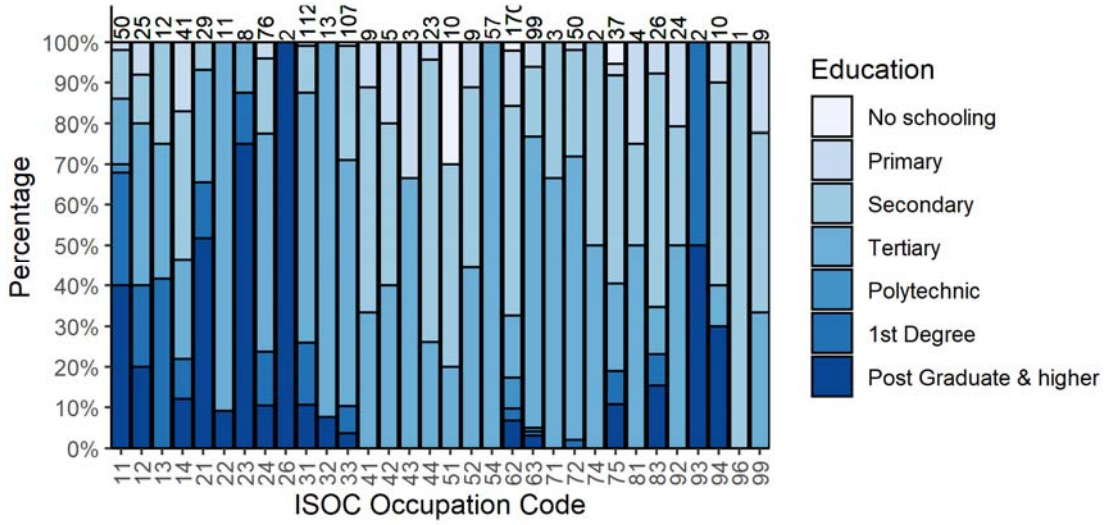

Figure 12. Education level bands reported by ISCO occupation codes.

Table 9. ISCO Occupation Codes (Level 2) as key for Figure 12.

Occupation Code	ISCO Description
11	Chief executives, senior officials and legislators
12	Administrative and commercial managers
13	Production and specialized services managers
14	Hospitality, retail and other services managers
21	Science and engineering professionals
22	Health professionals
23	Teaching professionals
24	Business and administration professionals
26	Legal, social and cultural professionals
31	Science and engineering associate professionals
32	Health associate professionals
33	Business and administration associate professionals
41	General and keyboard clerks
42	Customer services clerks
43	Numerical and material recording clerks
44	Other clerical support workers
51	Personal service workers
52	Sales workers
54	Protective services workers
62	Market-oriented skilled forestry, fishery and hunting workers
63	Subsistence farmers, fishers, hunters and gatherers
71	Building and related trades workers, excluding electricians
72	Metal, machinery and related trades workers
74	Electrical and electronic trades workers
75	Food processing, wood working, garment and other craft and related trades workers
81	Stationary plant and machine operators
83	Drivers and mobile plant operators
92	Agricultural, forestry and fishery labourers
93	Labourers in mining, construction, manufacturing and transport
94	Food preparation assistants
96	Refuse workers and other elementary workers
99	Not elsewhere included (nei)

As might be expected, there is a correlation between increased wages received by workers and levels of education across the fisheries sector as a whole (Figure 13). The pattern is partially obscured by the large variability in wages among occupations and often wide wage bands considered. Given the improvement in the Seychelles education system over the last 30 years it might be expected that workers average wages will continue to increase as they occupy more highly skilled occupations. However, the increased level of education also presents challenges in finding Seychellois workers to fill the low-skilled and low-paid occupations in future. Indeed, this pattern already appears to be emerging with a number of roles already having high proportions of foreign labour (see section 3.6.4).

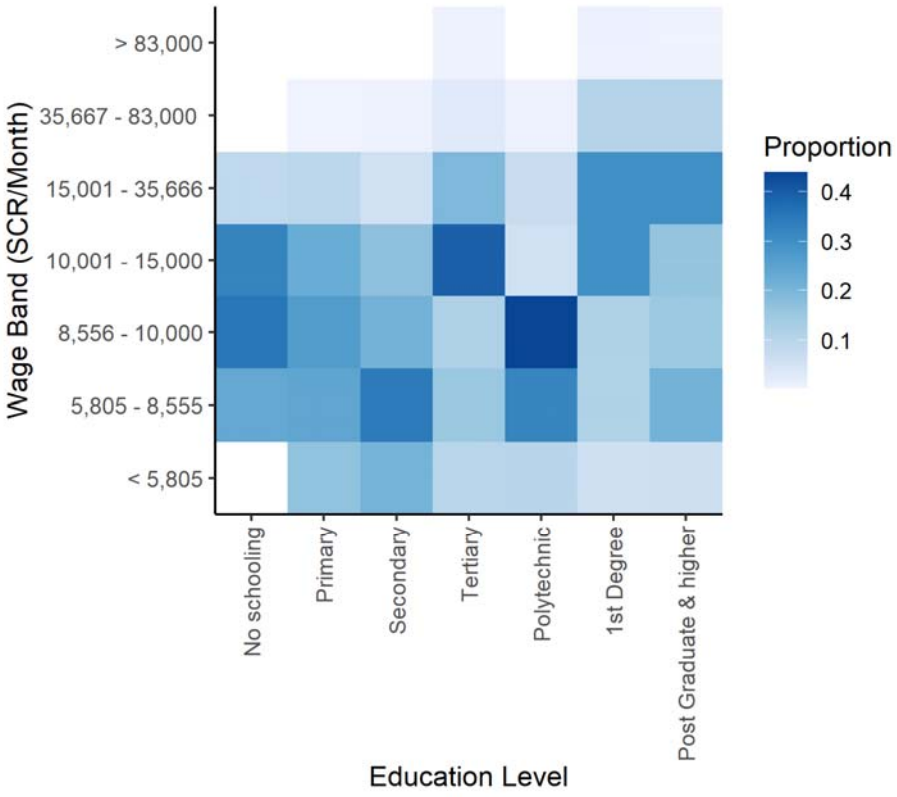

Figure 13. Distribution of wages received at increasing levels of education.

3.5.1 Predictors of wages in the Seychelles' fisheries sector

Examination of the data presented within this report suggest potential patterns in monthly wages may be related to job, working hours (i.e. part time or full time employment), education, nationality, gender and age among others. In order to better understand the importance of these variables in determining wages, and thus better inform potential future actions we must assess their relative contribution to predicting workers' wages.

The wage data available in this study is in the form of wage bands (selected to align with those already in use in the Seychelles). Wage bands are highly variable in their size (e.g. 5,805 - 8,555 vs 35,667 - 83,000) which undermines our ability to treat wage data as a continuous numeric variable. Instead, wage bands must therefore be treated as categorical factors. Thus, in order to assess the predictive power of job, working hours, education, nationality, gender, and age on monthly wages we used Gradient Boosting for classification. Gradient Boosting is an ensemble machine learning technique which utilises sequential weak prediction models (decision trees) to build predictive models.

Parameter selection for our model was undertaken using sequential grid searching (modelling the data using variable combinations of parameter settings and selecting for the best model fit). A total of 162 different model parameter combinations across 4 model parameters (shrinkage, interaction depth, bag fraction and minimum observation per terminal node) were tested and the best fitted (0.1, 4, 0.6, and 5 respectively) selected by minimising the Root Mean Squared Error. The optimal number of trees was selected by cross-validation to avoid overfitting, determined to be 60 in this case. The final model had a Root Mean Squared Error of 1.14.

The model successfully predicted monthly wages 55.9% (54.2 - 57.6% 95CI) of the time for the 3,324 workers for which wage data was available, far better than the 14.3% that would be expected by random chance alone. The model generally performed better at the lower wage bands relative to at higher bands: < 5,805, n = 872, success = 82.7%; 5,805 - 8,555, n = 724, success = 56.9%; 8,556 - 10,000, n = 526, success = 35.7%; 10,001 - 15,000, n = 687, success = 46.4%; 15,001 - 35,666, n = 437, success = 43.7%; 35,667 - 83,000, n = 66, success = 34.8%; and > 83,000, n = 11, success = 45.5%. ISIC code was the most powerful predictor of wage (relative influence = 52.2%), followed by education (17.0%), age (13.5%), working hours full time/part time (10.2%), nationality (4.79%), and gender (2.22%) (Figure 14).

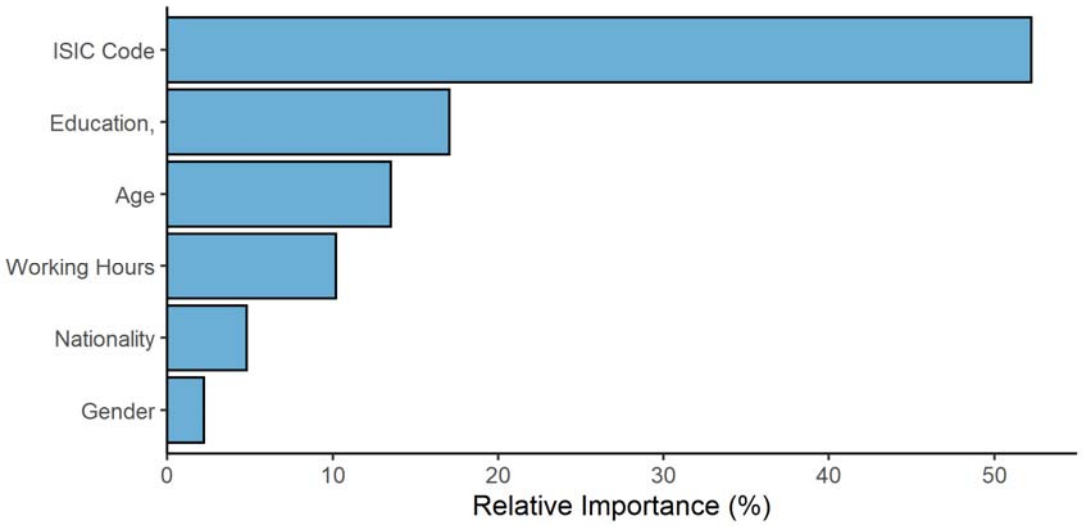

Figure 14. Relative influence plot for gradient boosting model

As might be expected, ISIC code was the most important predictor of wage but it is the importance of the other predictors which is of greatest interest. The relative importance of education, age (likely a proxy for experience), and working hours in predicting wages are far higher than either nationality or gender. This suggests that a substantial portion of the observed differences in wages between genders and between Seychellois/foreign workers may be attributable to these other factors. Further, the relatively small importance of both nationality and gender in predicting wage suggests that discriminatory practices with regard to wages may be relatively small, though the structure of the wage bands mean that variability within bands could not be investigated in full. In order to minimise the possibility of gender or nationality based wage discrimination it is key to ensure that access (equal opportunity) exists to jobs where female and Seychellois representation is presently low.

The data presented in other parts of this report suggest much of the difference in representation may be socio-cultural in nature rather than a result of discriminatory hiring. A targeted study would be required to thoroughly assess the evidence for discriminatory hiring and /or any subsequent discriminatory practices with regard to wages and sub-band scales. All future analyses with regard to wages would substantially benefit from improved granularity of wage data, ideally by increasing the resolution of wage bands and standardising the band size, or by the reporting of raw wages.

3.6 Identify the main labour and gender issues for the different components of the sector, including those stemming from increases in foreign labour (Task 9)

3.6.1 Labour Issues

The second generation "Decent Work Country Programme (SDWCP II) 2019 - 2023 for Seychelles" (2018) indicated that youth unemployment is high in Seychelles as compared to the national unemployment rate, and improving job opportunities for those young men and women, remains a major challenge. This situation was partly attributed to the relevance of the current education system with the industry needs and the changing labour environment that disfavours the youth population. More recently, the government in its 2021 Budget Speech, stressed on a policy to putting Seychellois first in the matters of employment. Nonetheless, as of January 2021, Seychelles had 12,690 active work permits for foreign workers and are continuously receiving requests for foreign workers in most sectors of the economy, including agriculture and fisheries.

The Seychelles has experienced a significant rise in the number of foreign migrant workers across a number of economic sectors including fisheries and closely related sectors (transport, processing etc). In 2019, there were 265 foreign individuals in the fisheries sector, excluding IOT[12]. The foreign labour originates mainly from Indian Ocean coastal States inducing India, Madagascar, the Philippines, Sri Lanka and Mauritius but a wide number of nationalities are present (see Section 27). The number of migrants from Western European countries has also increased in recent years. While primarily concentrated in low- and semi-skilled jobs in the construction, tourism, and manufacturing sectors, migrant workers also occupy highly-skilled positions in the tourism, financial and public service sectors. At the same time, emigration of Seychellois continues towards high income countries, suggesting an outflow of highly-skilled workers (see section 3.6.4.1).

Stakeholders were explicitly requested to identify those labour gaps that they were experiencing and the results included the following roles:

- Fish collectors;
- Fisheries management (research and management skills)
- Fishermen (artisanal);
- Fishermen (longlining);
- Machine operators;
- Mechanical and electrical maintenance;
- Processing and packaging;
- Production process analysts;
- Quality control (production and hygiene);
- Refrigeration technician; and
- Shipping and transport management and logistics.

Some stakeholders highlighted it is not necessarily a skills gap that is important to them filling positions but simply a shortage of the number of people prepared to do a particular job. The more technical roles of machine operators, refrigeration technicians and mechanical and electrical maintenance were highlighted a number of times. Stakeholders noted difficulties in employing permanent qualified staff. Although there are qualified personnel in the Seychelles, they are low in number and are in great demand working when and where they want, which does not match the stakeholders need for staff on 24 hour call or to match the shift patterns

[12] Source: Department of Internal Affairs - Immigration Division

of other workers. Foreign replacement staff on fixed term contracts are seen as the easiest alternative as they provide reliable workers who do not mind working shifts or weekends.

On the direct fisheries' specific roles, it was noted that insufficient fishermen are being "recruited" to the fishery compared to the losses from retirement and those leaving the fishery each year. Stakeholders noted, that although artisanal fishers are being trained at the Maritime College, only half of those complete the training and of those two thirds are not likely to work in the fishery. If this continues it would leave an older but smaller population fishing each year. This should be monitored closely over time. Currently, with the need to reduce pressure on the Mahé Plateau demersal fishery, this may not be a problem, but when an equilibrium level is reached and stocks are rebuilt, this could become an issue if the decline was not addressed. In the specific case of longline fishing, stakeholders noted that they tried to recruit locals to address the gaps but could not and would then look to fill these with foreign labour, though with COVID-19 restrictions in place this was proving difficult, if not impossible.

Shipping and logistics management do not require extensive training of engineers or technical staff but have on the job training and, experience is deemed of more value. Here it is a matter of finding the right candidate, training them to do the job and then retaining them.

Technical roles such as fisheries management, production analysis and quality control are more difficult as they require both the technical background and experience developed over time. These roles may require degree level training and a number of years on the job experience to successfully fill a labour gap at a junior level. Therefore, these specialist roles need careful consideration. Where a limited number of individuals play a critical role with the sector these key roles should be highlighted and redundancy in the role created, i.e. excess capacity maintained. Such roles can be critically affected by the retirement or emigration of one or two key individuals. Such roles are typically technical and scientific, including for instance fisheries management and stock assessment or veterinary roles for the approval of fish to be exported. Without these roles being adequately populated with a pyramid of staff under the primary individual(s) it will be difficult to provide replacements internally and once again reliance on *ex pat.* workers, even if only for a short time will be required (see Figure 15).

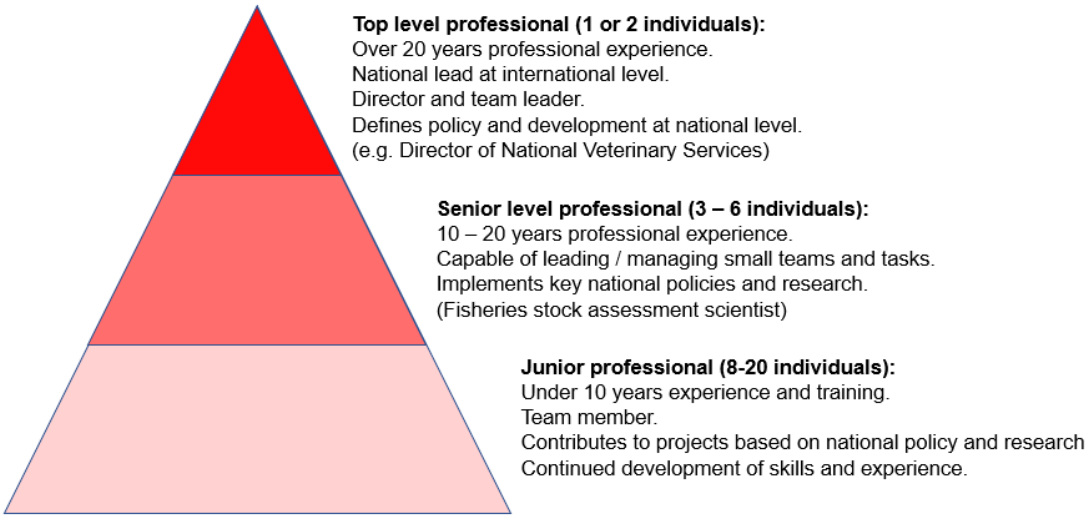

Figure 15. Example of professional progression.

The Blue Economy Roadmap (2018-2030) also highlights the need for high quality education, "Ensuring access to high quality education and professional training, new jobs and employment opportunities". This is a clear example of where high quality education provides inputs to the junior professional level and training is provided to allow individuals, where skills and aptitude allows, to progress towards the highest levels within their field.

3.6.2 Gender Issues

The Republic of Seychelles bans discrimination in employment on the basis of "age, **gender**, race, colour, nationality, language, religion, disability, HIV status, sexual orientation or political, trade union or other association" under Section VI of the Employment Act (1995)[13], though from stakeholder consultation the majority did not know that there was specific legislation to protect based on gender. It is also a signatory party to legally binding human rights treaties which focus on the promotion of gender equality and advancement of women including the Convention on the Elimination of all Forms of Discrimination against Women (CEDAW[14]) and its Optional Protocol.

Although Seychelles stakeholders were not all clear on the legal status of gender based employment opportunities, rights and pay, it was clear that all supported this and many had clear protocols and internal mechanisms to ensure that discrimination would not take place. For example, only one stakeholder responded that they had a specific policy but others noted this absence in their structure and saw this as an opportunity to implement one. Similarly, when asked about examples of training and progression that show how women can progress in their companies and if there are special programmes for women, most stakeholders responded saying that there were specific training programmes within various roles in their companies and that these programmes are open to all employees (and there is no gender bias or exclusion). Training opportunities appear to be open to all and encouraged. Where specific improvement courses were highlighted, these were more for management roles and allowing female staff to improve on their skills with courses such as "Certificate in Office Management", "Diploma in General Management" rising up to degree level courses such as "Bachelor in Business Administration". These will address the equality issues at the highest pay grades highlighted earlier when equality exists throughout company structures.

It is clear from the data collected and stakeholder views that, although equal rights are established, the traditional gender assigned roles relating to the direct fishing sector (ISIC codes starting 03) and transport and storage sector (ISIC code starting 5) e.g. fisheries workers (ISCO codes starting 622) are male dominated with only 11 female workers reported from 1,742 (0.6% female) and stevedoring still being solely male with transport and storage labourers (ISCO 933) reported being 100% male. These sectors that are traditionally male but employers state that there is no gender bias in the equality of opportunities but that women traditionally do not apply e.g. "I would employ a person based on his / her qualification skills and experience". In other situations stakeholders noted that due to the small size of some operations (e.g. small workshops) there are limited sanitary and washing facilities and women may not apply for these roles. When the more open sectors are examined e.g. clerical or technical roles where gender does not play a significant role the opportunities are clearly more equal, with Seychelles Fishing Authority being an example of equal opportunity.

Pay gaps and variability within those sectors with no traditional roles are similar for female and male workers. The typical pattern exhibited by workforces worldwide of female workers being paid closer to the mean with a lower spread of wages, versus male employees who have slightly more extreme in the lower paid roles and at the higher end. Over time these

[13] http://www.ilo.int/dyn/natlex/docs/ELECTRONIC/104158/126948/F869216815/SYC104158.pdf

[14] https://www.ohchr.org/en/hrbodies/cedaw/pages/cedawindex.aspx

differences are reducing as more women take higher paid roles on average as they are promoted through their businesses and organisations and are paid the same as their male counterparts at the same levels and it would be expected that this would happen in the Seychelles over time.

Globally, in Seychelles, the trend is there is a general lack of accurate, reliable and up to date information on gender equality or inequality across sectors or institutions in Seychelles. In terms of employment, there was a significant increase in gender wage gap across the wage distribution – with men earning wages that are 9% higher than women at the 10th percentile and 19% higher at the 90th percentile[15]. The access to employment, especially higher paid job favoured men, with more women in low paid jobs such as home carers (estimated 2,500) and other service industries (of the unemployed, 54% are women), and women are more likely to face redundancies in a male dominated labour market. Young women, and in particular single mothers or school drop outs with lack of employable skills and work experience are often finding it more difficult to access employment which are often shift hours and still have rigid full-time arrangements. In 2019, the less than 25 age group shows the unemployment with male and women at 9.9% and 8.9% respectively[16]. In 2016, the 'less than 25' age group employment for women stood at 16.3%, which present a significant decrease. Note that according to NSB, gender data in workforce is available only in Government and Parastatal organisations and the source data for the private sector is not disaggregated by sex and local/expatriate groups.

3.6.3 Age issues

The age distribution patterns within three key sectors 0311D (artisanal fishing), 1020 (processing and preserving of fish, crustaceans and molluscs) and 5222 (transportation) have been investigated to determine if there are issues pending in the future with an ageing population. It is clear from Figure 16 that the peak age group of the workers in these sectors is between 35-44 years with significant numbers of workers from each sector. However, the artisanal fishery has notably higher numbers of older workers in the 45-54 and 55-64 age groups. These workers do not appear to be being replaced as they retire from the younger age classes with few workers in the 18-24 age classes entering these three sub-sectors. It may be that these sectors will need to become more attractive to younger workers to replace those currently employed. A reduced level of fishing effort may be an advantage to support sustainable exploitation of fish stocks targeted by the artisanal fishery, although other sectors are likely to need to replace or increase the workforce if the semi-industrial and industrial sectors continue to expand.

In general, it is likely that these sectors will continue to see an aging workforce over the next one or two decades, with older workers retiring and not being replaced by new younger entrants to the workforce. Particular emphasis will need to be placed on recruitment into these sub-sectors to replace retiring workers with younger recruits (see section 3.10).

[15] Systematic Country Diagnostic, World Bank 2017

[16] National Bureau of Statistics – Statistical Bulletin, March 2020.

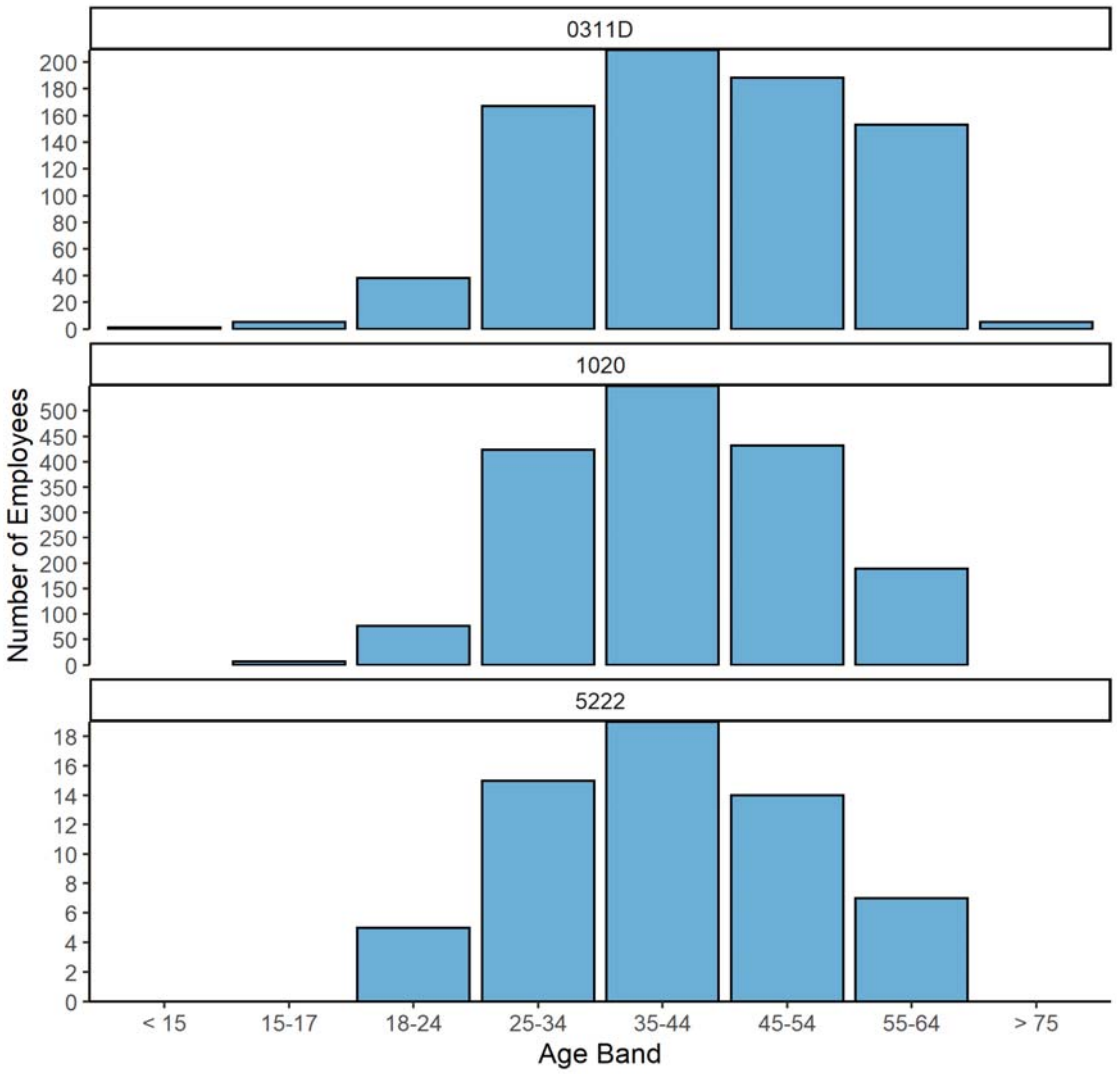

Figure 16. Age bands by numbers of employees in sectors (0311D (artisanal fishing), 1020 and 5122).

3.6.4 Foreign Labour

The current Seychelles National Labour Migration Policy (Ministry of Employment, Immigration and Civil Status)[17] has two key interventions of direct relevance to foreign labour (Intervention 3 and 4).

Intervention 3 proposes actions to "attract, retain and develop the skills needed for the Seychelles' labour market, in response to both quantitative and qualitative shortages in labour", i.e. addressing local shortages by developing short-term labour migration programmes whilst developing local capacity in required skills. We highlight below those skills indicated during this study that would assist the government of Seychelles in addressing this for the fisheries sector, and addressing both the school national curriculum and the specific advanced training requirements e.g. through the Seychelles Maritime Academy to allow locals to replace foreign labour over time in line with labour requirements. The intervention also

[17] http://www.ics.gov.sc/downloads/policies/labour-migration-policy/viewdocument

details that the government of Seychelles "will also undertake to engage with Seychellois abroad as well as potential emigrants to encourage return and retention of Seychellois with skills in need in the country". This may not be of direct relevance to the Seychelles fisheries sector but may apply to the more technical and scientific occupations codes (ISCO group 3 for instance).

Key intervention 4 is aimed at "fair and effective recruitment for all workers". Here, the government of Seychelles will "develop and enforce measures to protect workers from fraudulent and abusive recruitment practices, and ensure that a comprehensive regulatory framework for recruitment activities is in place" whilst ensuring local workers are not displaced or working conditions lessened. The government will also look at improving "the quality and reliability of recruitment processes" for foreign labour, in essence making sure that if a job is being taken by a foreign national then they are better qualified for the particular job than a Seychellois.

The current approach to the management of foreign or migrant workers is based largely on the premise that migration is a temporary measure intended to respond to short-term skills shortages until local human resources are sufficiently trained to replace them. According to the Employment Act, migrants can be employed for a fixed-term contract only. Foreign workers wishing to work in Seychelles must first be sponsored by an employer for a specific vacancy; there are no provisions for migrants to enter the Seychelles for the purpose of seeking employment.

In order to work in the Seychelles foreign nationals must possess either a Gainful Occupation Permit or an International Trade Zone (ITZ) Work Permit[18]. Holders of a GOP are allowed to be "gainfully occupied" in Seychelles either as an employee or as a self-employed person. ITZ workers are restricted to working for the companies based in the ITZ. The GOP application permit has costs associated for all prospective holders, with a processing fee of SCR 1,000 for processing of the application and SCR 500 per month pro rata for the duration of the application (which is for a maximum of two years after which a GOP may be renewed)[19].

To reserve highly skilled jobs for Seychellois and ensure absorption of lower-skilled local workers, a number of occupations are restricted. These include positions such as CEO or human resources director, as well as semi-skilled generalist positions such as sales assistants and low-skilled positions such as cleaners and drivers. The government experimented with establishing lists of jobs reserved for Seychellois workers in some industries. However, due to difficulties in recruiting local workers, pressures from employers in certain sectors (in particular tourism) led to the Government repealing the list in mid-2017, with the exception of HR posts.

As part of its strategy to restrict labour migration to a temporary measure, employers wishing to hire foreign workers may be required to submit a "localisation plan,'' which describe training strategies to transfer skills from migrant worker to the Seychellois within a given time limit. Currently, localisation plans are in place in some sector and are being enforced (S. Morel, personal communication, 2020). There is a "Localization Unit" in the Employment Department that is specifically tasked to coordinate and enforce localization plans. However challenges are encountered both from employers, foreign workers and local workers undertaking training e.g. (delays to the localisation or that once in place the foreign nationals recruited to the post do not actually train their local counterpart or the counterparts themselves are discouraged and quit before training is complete) (L. Camille, personal communication, 2020).

[18] http://www.ics.gov.sc/permits/international-trade-zone

[19] http://www.ics.gov.sc/permits/gainful-occupation-permit

It was reported in February 2021, that the Government of Seychelles had reviewed the GOP framework to allow the availability of more jobs for locals, though the medical, fisheries and agriculture sectors would not change. It should be noted that from February 2021, renewal fees for processing would also be required. An international trade Zone Work Permit allows a non-Seychellois to enter and remain in Seychelles for the purpose of employment in an International Trade Zone. It is the responsibility of the prospective employer to apply for the permit through the Financial Services Authority (FSA), Seychelles.

The following table shows where the foreign labour in the Seychelles fisheries sector is concentrated (in terms of the ISIC sub-sectors). However, the physical employment of foreign workers is highly skewed towards small companies with only a few foreign workers and a few companies with high proportions.

Table 10. Percentage foreign workers aggregated by ISIC sub-sector.

ISIC Sub-sector	Seychelles	Foreign	Total	Percent Foreign
Marine fishing - Purse seine-0311A	3	40	43	93.02%
Marine fishing - Longline-0311B	38	326	345	89.56%
Processing and preserving of fish, crustaceans and molluscs-1020	760	1480	2240	66.07%
Marine fishing - Semi-industrial-0311C	128	121	249	48.59%
Marine fishing - Invertebrates- Sea Cucumber-0311E1	60	56	116	48.28%
Repair of machinery-3312	18	9	27	33.33%
Cargo Handling-5224	76	38	114	33.33%
Building of pleasure and sporting boats-3012	62	20	82	24.39%
Retail sale of food in specialized stores-4721	26	6	32	18.75%
Activities of extraterritorial organizations and bodies-9900	22	3	25	12.00%
Sea and coastal passenger water transport-5011	131	5	136	3.68%
Other professional, scientific and technical activities -7490	298	6	304	1.97%
Service activities incidental to water transportation-5222	298	2	300	0.67%
Marine fishing - Artisanal-0311D	936	6	943	0.64%
Sea and coastal freight water transport-5012	27	0	27	0.00%
Marine fishing - Invertebrates- Octopus-0311E4	31	0	31	0.00%
Wholesale of food, beverages and tobacco-4630	34	0	34	0.00%
General public administration activities-8411	39	0	39	0.00%
Marine fishing-0311	90	0	89	0.00%
Activities of business and employer's membership organizations-9411	104	0	104	0.00%

NB: ISIC sub-sectors of <20 combined workforce excluded.

Attitudes of stakeholders demonstrates a clear need for foreign labour. There were two main reasons given for this:

- **To meet a known skills gap**: Typically in support industries where machinists, plant operators and other technically trained staff are simply not available in sufficient numbers to address the local skills gap, or refuse to work in certain conditions (e.g. a processor noted that due to the nature of their plant it was not a good environment to work in and often local staff would refuse to work there and only foreign staff could be persuaded to stay).

- **To fill jobs Seychellois will not take:** These are typically in the specialised fisheries sub-sectors (Marine fishing - Purse seine-0311A, Marine fishing - Longline-0311B, Marine fishing - Semi-industrial-0311C and Marine fishing - Invertebrates- Sea Cucumber-0311E1) where fishing trips are often longer than a few days, conditions (excepting purse seiners) not as high as Seychellois fishers are reported to want and long shifts are required. In some other roles, stakeholders note that some of the Seychelles workforce are "lazy", "unreliable", "will not work weekends" and "will not work shifts" and refuse jobs that require shift work or work outside the normal working hours on Monday to Friday. A number of stakeholders also noted that most of the work required can be done by a local person but local workers are either not trained or are not being trained for these roles.

3.6.4.1 Retention of qualified Seychellois

As noted in the National Labour Migration Policy, the Government of Seychelles is committed to engaging with Seychellois abroad as well as potential emigrants to encourage return and retention of Seychellois with skills in need in the country. This will not be an easy policy to enforce. Students studying overseas may be offered jobs or the opportunity to extend their studies and "golden handcuff" style deals to require a period of time working for the Government or in the Seychelles for a private company after graduation may not be popular. However, students on Government scholarship and who do not wish return to Seychelles have the option to reimburse Government their cost of training. There is potential for retention of qualified personnel in the sector beyond the normal retirement age. Under the Employment Act[20] (para 66) provisions are made for employees beyond the retirement age be retained after approval by a competent officer where there is not "a younger person suitably qualified to replace a person who has reached retirement age". In the case of retention to provide training this would be a clear case where this could be applied.

From 2014, the government implemented a quota-based work permits system for the private sector as part of a strategy to protect the local labour force and facilitate recruitment of foreign workers for positions where local workers are not available. Under this system, companies in main industry sectors, which include construction, tourism, fisheries and manufacturing, can apply to the Employment Department for a Certificate of Entitlement, allowing employers to recruit workers from overseas within an assigned quota without prior labour market testing, regardless of skill level or profile. As stated earlier, from February 2021, employers with COE have to submit vacancies to Employment department to check availability of locals and issue approval, prior to recruitment of a foreign worker (S. Morel, personal communication, 2020).

Two of the main components of foreign labour are the IOT factory, which has historically maintained high numbers of foreign workers and the highly specific fisheries operated from the Seychelles including the semi-industrial longline fishery and the sea cucumber (diver) fishery. As they have continued to expand both fisheries have seen an increase in foreign workers being used to fill a skill gaps within the fishery. Specific questions may be directed at those involved in these two cases that highlight issues across Task 9 (section 3.6) and Task 10 (section 3.7).

3.6.5 Specific Issues Relating to Artisanal Fishers

During the review phase of the development of the questionnaires four additional questions were requested. These were as follows;

- Do you contribute to a pension?

[20] See http://www.employment.gov.sc/e-library/acts-and-regulations/employment-acts-and-regulations for details

- Do you make contributions to an insurance scheme?
- Do you get benefits during periods of sick leave?
- Are you a registered fisher?

The summary responses to these questions can be found in Annex 1 (Figure 38 to Figure 41). The main purpose behind these questions is to look at the level of government dependency of artisanal fishers either now in terms of insurance provision or sickness benefits, or looking into their contributions towards a pension and therefore future shortfalls that may need to be made up by government and if whether these issues are more skewed towards informal or formal employment. These would only be made to fishers registered as such, so therefore the level of registration within this industry group is also important.

The data show that over 86% of the fishers surveyed are registered with SFA, but when we look at the pension contributors, in terms of registration, only 76% of unregistered fishers had a pension compared to 92% of the registered fishers. Similarly, when contribution to an insurance scheme is considered, 68% of unregistered fishers have made contributions to an insurance scheme compared to 91% of registered fishers. When looking at the division between registered and unregistered fishers in terms of claiming benefits during periods of sick leave, only 67% of the unregistered fishers say that they have received benefits during periods of sickness compared to a very high 97% of registered fishers. It is clear that registered fishers are aware of their right to benefits when sick and use these rights. This may also be true for unregistered fishers although this appears to be at a lower rate.

3.7 Identify challenges and solutions for domestic and foreign labour recruitment to the fisheries sector and related activities (Task 10)

There are a few critical sectors identified, where domestic and foreign labour are in direct competition for jobs (i.e. where the foreign workforce makes up more than 10% of the sector and >10 employees). These as have been highlighted previously and are shown in Table 11:

Table 11. ISIC Sub-sectors where foreign workers make up more than 10% of the sector (where sector >20 employees).

ISIC Code	Seychelles	Foreign	Total Number
0311A Marine fishing – Purse Seine	17.65%	82.35%	14
0311B Marine fishing - Longline	40.57%	59.43%	63
0311C Marine fishing – Semi industrial	59.85%	40.15%	53
0311E Marine fishing – Invertebrates	58.97%	41.03%	32
1020 Processing and preserving of fish, crustaceans and molluscs	36.40%	63.60%	1106
3012 Building of pleasure and sporting boats	80.65%	19.35%	31
4721 Retail sale of food in specialized stores	81.25%	18.45%	32
5224 Cargo handling	85.71%	14.29%	49

The major challenges that have been identified during stakeholder engagement fall into two categories:

i. **Marine fishing sub-sectors** (0311A, 0311B, 0311C and 0311E). Stakeholders identified in each of these four cases either an absence of the necessary skills to work in these highly skilled sectors or a reluctance on the part of many Seychellois to work. The latter may be due to time spent away at sea on a single trip, working through weekends or extended hours when compared to the Seychellois dominated artisanal fishery where workers can control their own working hours and patterns. The 2021 Budget indicated that all the social

welfare programmes will be reviewed and Unemployment Relief Scheme (URS)[21] scrapped and all efforts should be made by the Ministry of Employment and Social Affairs to ensure that those on the scheme find employment.

ii. **Processing and cargo handling sectors**. Stakeholders identified that work in these sectors can be hard, shift-based and often indoors on factory floors. Once again Seychellois are noted by stakeholders not to want to work in these jobs where shift work is required, some portions of the Seychelles' workforce have been identified as 'lazy' compared to their foreign counterparts, who are happy to work weekends, shifts around the clock and operate in workplaces that may not be the most aesthetically pleasing (e.g. processing lines). This was clearly visible where a number of stevedores in the cargo handling sectors were migrant workers, though it was noted that a significant number of local stevedores worked in this sub-sector as casual workers, which enabled them to control days they want to work and when not to work, e.g. weekends which may not match up the supply and demand in this sub-sector.

The other two sub-sectors are not explicitly mentioned by stakeholders. It can be clearly seen that these sub-sectors may require specialist skills (e.g. building of pleasure or sporting boats) that may not be available in the Seychelles currently and foreign skilled workers are therefore brought in to the workforce, or in the case of retails sales, these may be family businesses or foreign workers are brought in to fill a role related to specialist food preparation.

Therefore, when we look at aligning the workforce with the Government of Seychelles plans to replace foreign with skilled Seychellois labour or if there is a requirement for possible further expansion of the foreign labour force looking into the future, there are several challenges that need to be addressed and associated proposed solutions. Many of these are simple solutions to address problems such as identify a gap and either train locals to fill the gap (medium to long-term solution) or recruit foreign workers to fill the gap (short to medium-term solution).

Current policy guidelines dictate that the only fisheries sub-sectors that can benefit from employing foreign labour are processing, semi-industrial and sea cucumber fishing.

Training in Specialist Fisheries: One of the key issues highlighted is preparing the Seychelles workforce to fill roles when they are made available. If these workers are not trained at least to an accepted base level, then employers will always look to foreign workers to fill the gaps. It is recommended that discussions with employers can help identify a key minimum level of training for workers on board each type of vessel. This can then be built into specialist fishing training programmes for each sub-sector at the Seychelles Maritime Academy[22] through the "*Advanced Certificate in Fisheries Science and Fishing Technology*" or the "*Certificate in Fishing Technology (Apprenticeship)*" and potentially though the University of the Seychelles[23]. Currently only "Semi Industrial Fishing" (including semi-industrial longlining, drop lining and sea cucumber fishing) is included in the advanced certificate and this could be expanded with additional options or mandatory elements for longline and purse seine. Government scholarships, perhaps part-funded by industry and including a potential job at the end have been highlighted as another potential way forward. Employers are not always keen to accept quotas of national workers on board vessels when

[21]The Unemployment Relief Scheme (URS) was set up to facilitate employment for the most vulnerable groups of society, with the aim of improving their quality of life in assisting them in securing a permanent employment. However, many were on the scheme indefinitely.

[22] http://www.sma.edu.sc/

[23] http://www.unisey.ac.sc

they are not trained as they are often regarded as one member of crew that is not equivalent in their output to the others, but if training has already brought them close to this level it will be easier to implement quotas if required. It was also noted by stakeholders, that the dropout rate on these courses was high and that even when they do complete the course many do not take up fishing as a full time profession. It is recommended to conduct some research into why course participants do not complete the course and what other jobs they undertake in order to better focus the course and provide the necessary encouragement to stay in the industry or at least the fishing sector. Training of fishers is often highlighted as a key element of capacity building, e.g. by the FAO in terms of a cross-cutting issue for capacity building and sustainable development[24].

Training in other areas: During the stakeholder consultation, when given an opportunity to suggest ways of reducing the number of foreign workers, it was suggested similar to fisheries skills above, that students could be given the opportunity to undertake training with processing firms, looking at all the different aspects of the work conducted, from basic processing, hygiene and quality control, engineering related to processing lines and freezing technology during the training. Individuals would then be better aware of their own aptitudes and where they can fit in to an existing system and the training they would require, which again could be developed with industry involvement and sponsorship. Potentially short courses could be developed, through SMA alongside industry with on-the-job training elements for those mechanical and electrical roles within the fisheries sector. These could even be expanded to provide a certificate level qualification in "Production Engineering (Apprenticeship) to support the Fisheries Sector". The possibility of training candidates up to Skipper/Master Fisherman qualifications should also be explored through the SMA. The apprenticeship programme could be support by the industry.

Attitude of Seychelles Workers: One of the striking results of the stakeholder consultation was a common understanding by employers that some sections of the Seychelles workforce were seen as "lazy" and "inflexible" in their working practices. Most stakeholders though, would not directly address what Seychellois workers would not do, most would highlight the advantages of foreign workers instead. Foreign workers arrive on time every day, work hard, work weekends, if necessary (paid fully for this), work shift patterns where this is required and employers are keen to maintain this even with the additional costs of bringing foreign workers into the country and providing them with food and accommodation. Young Seychellois workers were often identified as not being interested in working in the fisheries sector, either directly in capture fisheries or on the processing or marketing side. Even with government programmes where half the wages are paid by a government scheme and half by the employer this is not enough to persuade young workers or their employers to facilitate work in the sector. Education may be a key part of this and the curriculum on environmental issues and fisheries in particular with an emphasis on sustainable management in primary and secondary schools would be of benefit if this can be included. NB: This has previously been recommended as part of the development of education in respect of the Blue Economy and attainment of the UN Sustainable Development Goals (in particular SDG 14).[25]

Recurrent short-term use of foreign workers: Some sub-sectors will always potentially benefit from the introduction on a short-term basis of foreign workers. These will often take the form of technical experts brought in for a period of time and over that time their skills will be transferred across to their Seychelles counterparts. This can also be achieved through the recruitment and return of Seychellois expats who have been working abroad and bring their experience back and into the Seychelles sector.

[24] FAO Fisheries Division – Capacity Building and Training http://www.fao.org/fishery/topic/16033/en

[25] https://sdgs.un.org/goals/goal14

This could include stock assessment experts, trained (up to PhD and post-doctoral level) and having worked in fisheries around the world, mechanical or electrical engineers across many sectors who can lend their experience to developing and managing factories, ice plants etc. and fishers who having worked in similar fisheries in other countries use this experience to train Seychellois in doing the same job over a period of time, (e.g. the use of Sri Lankan fishing masters in the semi-industrial fishery).

3.8 Examine any trend in employment by comparing the survey results with previous surveys undertaken (Task 11)

Since 2014, the labour force survey (LFS) has been published on quarterly basis. SFA reports an estimated number for employment in its annual reports for the fisheries[26].

Direct and indirect employment in fisheries and related sectors was estimated to be between 5,000 – 6,000 people in 2014 (the latest publicly available SFA Annual Report), representing around 10% of total formal employment in the country. This estimate also includes people employed by the SFA as well as in fish processing, export activities, net repairs, ship-chandelling and stevedoring. Direct comparison of trends were difficult to establish as the data collection for this study was sample based and not a full complete census of the sector. Census style data collection was not possible due to cost limitations and subsequently through the COVID pandemic impacts.

The Indian Ocean Tuna (IOT) canning factory is by far the largest single employer, with a workforce of approximately 2,300 workers of which over 70% were foreign nationals. This compares to approximately 2,500 in 2005 (Nageon de Lestang, 2005) and 2,143 in 2018 (Blue Economy study). This shows a relatively stable workforce overall and the main driver of any trend at IOT will be the amount of raw material entering the factory over time. With the current proposed reduction in catches of yellowfin tuna (proposals made to 24th and 25th sessions of the IOTC Commission), and potential reduction in effort reducing the catch of skipjack tuna, there may be a restructuring of where tuna catch is processed and the volume passing through the factory. These changes may be seasonal in nature as well, impacting the periods in which the workforce would be required and possible composition (local workers may fare better than non-Seychellois), though this may be mitigated through use of cold storage to even out the supply of fish to the factory, maintaining a steady output across the year. In 2005, it was reported that the workforce comprised of 63% Seychellois but by 2018 this had changed quite significantly to 23% Seychellois, and in the detailed data collected in 2020 there were 31% Seychellois (486 Seychellois in a total of 1,549 workers (excluding stevedores)) reported, this may reflect a change due to worker availability during the pandemic though this is not clear.

The number of full- and part-time commercial fishers varied between 1,300 and 1,400. In this employment study the majority of data received covered the artisanal sector, with additional data for the local semi-industrial and sea cucumber fisheries. Data for the purse seine sector were not able to be collected and compared against previous estimates, although the number of vessels has not changed greatly since the Blue Economy report (2018) which reported that there were “about 1,590 personnel employed on-board the 54 Seychelles flagged industrial fishing vessels… 1,080 personnel on 36 longliners, 430 personnel on 13 purse seiners and 80 personnel on 5 supply vessels”. As noted above, the reduction in industrial fishing activity may temporarily reduce these numbers. In 2014, a maximum of 45 Seychellois seamen made at least one trip on board purse seiners (16 aboard Spanish vessels and 29 aboard French vessels).

The local processing factories employ around 190 workers (ISIC code 1020) compared to 134 reported in the Blue Economy study which reported on six local companies compared to 15 in

[26] http://www.sfa.sc/index.php/publications/Annual-Reports/

this study. There appears to have been an expansion in employment in a number of the larger companies (e.g. Ocean Basket increasing from 24 to 33 employees) as well as an increased number of small (<10 employee companies). The main constraints facing the local artisanal fishery from the Mahé plateaux are linked to the declining catch rates from the demersal fishery in particular high profile target species such as bourgeois. Previous recommendations regarding the management of the demersal fishery have encouraged reduction in the overall level of effort. This would have an impact on the number of fishers and processing capacity required. As this fishery supplies the HORECA sector the impact of COVID long-term on the sector may have consequences for the artisanal sector.

The growing semi-industrial fishery (tuna longliners) now employs an estimated 70% of foreign crew, the prospects for increasing this fishery depend heavily on the quota allocation process for yellowfin tuna and swordfish currently under discussion at IOTC. To maintain this fishery the Seychelles must maintain and internally allocate quota to this sub-sector, which will create internal competition with the purse seine sector.

In 2014, approximately 150 people were directly employed in the sea cucumber fishery as divers, skippers and apprentices. The recent attempts at stock assessment of the sea cucumber have not been successful in indicating if any increase in catches is possible in this fishery. The likely trend would therefore be flat with no potential for increase or likelihood of decrease.

Previous large employers such as the Coetivy prawn farm that was reported in 2005 as employing around 330 workers (Nageon de Lestang, 2005) are no longer operating, having become unprofitable and closed in 2009. More recently however, there has been a move by the Island Development Company (IDC) to reopen the prawn farm on Coetivy. It was noted that foreign labour would be needed for the farms but no detail on the split or opportunities for Seychellois workers were known at the time of this study.[27] If prawn aquaculture increases, this may require additional specialised scientific support, e.g. hygiene and water sampling from government bodies.

In terms of government employment in management, control and surveillance we know that the last estimate from Seychelles Fishing Authority employed 123 people, but numbers with MFAg directly involved in fisheries and those at other Seychelles government bodies e.g. Seychelles Coastguard, Island Development Corporation (IDC) are not fully known or estimated. Particular roles within the management structure have bene identified as requiring recruitment e.g. fisheries science and management.

One sub-sector that has grown significantly in the last twenty years was the sports fishing. This is an important activity for charter boat owners catering for tourists although the impacts of COVID during this study meant that little information was available from this sub-sector.

3.9 Determine the human capacity needs of the different fisheries and fishery-related activities based on trends and anticipated developments (Task 12)

Human capacity planning is critical in ensuring current and future demands are anticipated and met. When mismatches between capacity and demand occur, problems, delays and missed deadlines are more likely to occur. Information received from the Agency for National

[27] http://www.seychellesnewsagency.com/articles/14403/Seychellois+team+to+manage+relaunched+prawn+farm+on+Coetivy+Island%3B+foreign+labour+also+needed

Human Resource Development, indicates that the majority of labour demand are in fisheries or sea-going categories, (see Figure 12Table 12) including:

- Able seaman;
- Bosun (deck supervisor);
- Semi-industrial fishers ;
- Divemasters; and
- Skippers.

Each of these key roles are crucial in their related fishery economic activities. Other roles highlighted as in demand that are land-based but still technical in nature but related to the fisheries sector and where foreign workers have been brought in to the Seychelles include:

- Fibreglass plant workers;
- Fish processing workers;
- Machinists;
- Mechanics – Marine;
- Technician – Electrical Engineering;
- Technician – Mechanical Engineering; and
- Technicians – Net.

For example the fisheries Common Cold Store (CCCS) project on Zone 14 is due to be completed around July 2021 and will create 90 new jobs in processing and technical levels. These roles highlight clear skill gaps in the Seychelles that can be filled through training and the internal development of skills. Other roles are identified but are of a very general nature and should be able to be supplied internally with a little adaptation of current skills from the local workforce. For example, there are eight different classifications of management role that Seychellois should be able to fill given relevant training and more importantly experience.

There are a number of key high-level roles that have not been advertised locally but have resulted in the recruitment of foreign workers to fill these roles. These include high ranking roles such as the three Chief Executive Officers (CEO), four chief engineers and two marine engineers, which highlights the lack of available Seychellois to fill these roles, or possibly foreign owned companies that prefer to place their own staff fin these roles.

There is also a notable difference between the demand in 2019 and the demand in 2020 which has dropped significantly because of COVID-19. As industry has suffered during the pandemic the need to fill roles has become less important but should recover as borders reopen, the HORECA segment starts to operate and the demand for fish increases.

It has been argued that education and skills development is key to addressing employment and unemployment situation, but the educational system is still producing a large share of the youth lacking in necessary academic, soft, and vocational skills and delivers a small number of educated graduates that are not necessarily targeted are areas of critical needs or skills shortages. To address this gap, the Seychelles Maritime Academy or other educational establishments should have the ability and capacity to attract and motivate the Seychelles youth to enter the fisheries sector with the skills needed.

The highest number of registered job seekers was in age range between 15 and 24 years old (n = 161). According the employment statistics only 11 were placed in the fisheries and agriculture industry.

The matching and mismatching of labour and skill supply and demand in the labour market is reflected as follows:

- High unemployment in the youth levels, which indicates a poor match between the labour supply and demand.
- There are recruitment difficulties and skill shortages (domestically), which have a significant impact on business performance in the sector.
- The skills gap whereby staff lack proficiency to their job seems to be common at the low level entry and at the top-level both in terms of management (e.g. CEO) and technically (e.g. chief engineers) into the sector hence the dependence on foreign labour.

To address these gaps, it will require more input from the industry and a better understanding of the labour dynamics and current training to feed into any subsequent training plans. The "My First Job" scheme (MFJ) was implemented in 2016 by the Employment Department and is aimed at encouraging employers to recruit professional graduates: aged between 15 to 25 years, upon completion of their studies. This scheme has the objective to reduce the level of youth unemployment registered by 18 participants in 2019 for the fisheries and agriculture sector[28]. It may be that this scheme needs to be addressed at a lower more technical and vocational level to ensure the lower-level opportunities can be filled from the domestic supply and not rely on foreign workers.

Table 12. Summary of demand and shortages (i.e. foreign workers approved) by role in the Seychedlles fisheries sector in 2019 / 2020.

Occupation	Shortage (Foreign Workers approved)		Demand (Jobs Advertised)	
	2019	2020	2019	2020
Able Seaman	30	8	19	8
Attendant - Cold Store	2	0	0	0
Boatman	0	0	1	0
Bosun	0	8	0	0
Butcher	1	7	1	0
Chief Executive Officer	0	3	0	0
Crew General	0	0	8	0
Cook - (General)	0	4	0	1
Divemaster	23	0	1	2
Driver (General)	0	0	0	1
Engineer - Chief	0	4	0	0
Engineer - Marine	0	2	0	0
Fibreglass Plant Worker	1	3	2	4
Fish Sorter/grader	0	0	1	0
Fish Processing Worker	2	2	2	3
Fisherman - Industrial Semi	67	166	66	81
Inspector - Quality Control	0	0	1	0
Housekeeper	1	0	2	0
Machinist	0	1	0	2
Manager - Administration	0	1	0	0
Manager - Assistant	1	0	0	0

[28] Statistical Bulletin on Labour and Employment Data – January 2019 – December 2019 - Department of Employment.

Occupation	Shortage (Foreign Workers approved)		Demand (Jobs Advertised)	
	2019	2020	2019	2020
Manager Quality Assurance	0	0	1	0
Manager - Operations	1	1	1	0
Manager - Sales	0	1	0	1
Manager - Shop	0	1	0	1
Manager - Transport	1	2	1	2
Marine Master	0	0	1	0
Mechanic - (General)	1	0	0	0
Mechanic - Marine	5	4	10	4
Office Assistant	0	0	0	1
Officer - Export	1	0	1	0
Officer - Project	0	0	1	0
Officer - Import	0	0	0	1
Officer - Sales and Promotion	0	1	0	1
Officer - Technical Cooperation	1	0	0	0
Oiler	0	4	2	1
Pilot - Ship/Captain	0	4	0	0
Ship Master	0	1	0	0
Skipper	10	15	11	9
Technician - Electrical Engineering	0	1	0	0
Technician - Mechanical Engineering	2	0	0	0
Welder	0	0	2	0
Technician - Net	4	0	0	0
Grand Total	**154**	**244**	**135**	**123**

A number of opportunities in the fisheries sector are in development, though with the impacts of COVID-19 prior predictions of growth may be slowed. These include:

Development of Port Victoria – The planned expansion and modernisation of Port Victoria is extensive with additional berths and operating space on the quay side allowing for efficient management of visiting vessels. As well as the initial development work presenting job opportunities in creating the new quay and managing future operations, it will create the potential for additional fisheries traffic and may draw some business (particularly longliners and reefers) away from other ports such as Port Louis or Cape Town. NB: This is critically dependent on the outcomes of the current IOTC Technical Committee on Allocation Criteria (TCAC) discussions and the outcomes of the discussion on yellowfin tuna quota, that could reduce or limit fleet expansion in the region. It is the potential to develop Seychelles as a tuna hub for the longliners of the Indian Ocean and into a tuna processing hub for both purse seine and longline catch that would open up employment opportunities. The increased domestic processing will enhance employment across a number of sub-sectors as well as increase exports.

Increased Port Services – Where there is an increase in port activity there is a necessary increase in port services, from stevedores and drivers moving cargo and fish, through port control and inspection to management.

Government Organisations – The development of the port and related planned increased fishing capacity would include proportional increases in staff across most areas. It is likely that between 6-20 additional technical staff of various occupations would be needed based on a 10-20% increase in volume through the port, spread between the Ministry of Fisheries and Agriculture and SFA.

As part of any future human capacity planning exercises we would recommend:

- To better understand these gaps moving forward, it is recommended that the standard ISIC (industry classification) and ISCO (occupation) coding systems are used to identify demand and supply (domestic and foreign). These can then be used to compare against the current situation, calculate replacement rates for each group and any other indicators required.

- To work with industry leaders and key employers and support them in the long-term development of local capacity, capability and confidence in demand and capacity modelling and reduce reliance upon external resources. For example, it will be unlikely that companies that bring in foreign CEOs will employ a Seychellois CEO if they have never had experience of Seychellois working at low and mid-level management positions. The more exposure domestic workers have to these roles over the next ten or twenty years the higher the likelihood of making the step to CEO.

- To develop and deliver national training programmes to embed knowledge and expertise within local fishing sector economies, emphasising the gaps in current skills.

3.10 Youth recruitment

Youth engagement with the fisheries sector is a clear issue. The workforce, although not considered old, is ageing and encouraging young fishers to recruit into the sector is an issue even with a need to reduce capacity. The youth sector (under 24 years) represents about half of the Seychelles population (50.5% in 2016), with slightly fewer women (48.9%) than men (51.1%)[29]. The current level of unemployment of youth below 25 years (15-24 years) was estimated at 17% in third quarter 2020. Due the impact of COVID-19, the youth unemployment was estimated at 19%.

The responses covered the following nine areas.

3.10.1 Working Conditions

One of the key areas that needs to be addressed in terms of youth recruitment into the fisheries sector are working conditions. Several aspects of the fisheries sector have been highlighted:

Work patterns – Seychellois youth appear to be discouraged by the non-standard hours (particularly when working at sea), the potential for shift working requirements (land-based) and there is biasness in earnings across occupation level and nationality. Also the fact that fisheries includes a lot of informal employment.

[29] Seychelles Decent Country Work Programme (2019-2023) (2018).

https://www.ilo.org/wcmsp5/groups/public/---ed_mas/---program/documents/genericdocument/wcms_674580.pdf

Wages - Many young potential recruits looking at the fisheries sector may consider the entry level wages lower than other sectors (e.g. HORECA where additional supplementary income may be derived from tips) or allow for more flexible options for additional earning potential (extra shifts or second part-time jobs). It has been suggested that maybe a higher minimum wage for fisheries could be explored or a specific allowance for younger workers.

Lack of clear benefits from the sector – Young workers would compare the work in the fisheries sector to other potential jobs and take into a number of factors including potential for travel and advancement, working environment, physical requirements of the job and decide fisheries is not the best option available.

Workers' Protections - Fisheries workers are often difficult to be represented by a trade union in order to negotiate on their behalf and develop collective agreements. Many are self-employed or in family businesses, others distributed across the country and find organisation physically difficult.

3.10.2 Education

The most common response from fishermen (over 58% of respondents) was that there is a need to educate Seychelles youth in what the fishing industry is, the importance to the Seychelles and that it can provide a profitable living. Responses suggest education at all levels from primary school to further education (e.g. courses at the Maritime College) would be beneficial. One of the key ideas that seems clear is the need to use fishers in these courses and not just a bare academic subject. A summary of responses is provided in Figure 17.

Technical and Vocational Education and Training (**TVET**) institutions exist on Seychelles, notably the Seychelles Maritime Academy, the Seychelles Institute of Technology and the Seychelles Tourism Academy. UNESCO urges member states to improve the status of TVET by building learning pathways between different education streams. To achieve this, it is necessary to evaluate impacts and outcomes of TVET education policies and programmes, to collect data on the transition from learning to the world of work and on the employability of graduates paying attention to disparity. It seems learning and career pathways may be missing and probably that is why many young people fail to enter the sector. The fisheries authorities also need to have vested interest in technical and vocational training and not just higher academics. Steps were being taken in 2019 by the Government to establish a TVET school but apparently put on hold.

Education however may be seen as a "low-hanging fruit", a way of acting using existing frameworks to provide a response, but this may not have the desired effect. Education will need to be combined with more practical aspects to encourage entrants into primary capture fisheries. But the same time, what is possibly being portraited is that the outputs of the educational system is a mismatch of the needs to the sector. Fishing is a specialised sector although a number of skills can be acquiring through on job training. Elements raised refer to specific skills such as the need for more focused training to be provided in the field, fish processing such filleting, use of bench saw, vacuum packing, portioning, fish grading etc. A lot of businesses would prefer to employ someone who could just get on with the job at the start of their employment with minimal training.

Education at school
Education and advets
Education
Educate youth more on fisherman and sea
Educate youth more about fisherman
Educate youth at school level
Educate well
Educate them in school first
Educate the youth on fisherman
Educate the youth more not only at post secondary school
Educate the youth more
Educate the youth as much as government can do so
Educate the youth
Educate students at postsecondary level
Educate students
Educate pupils more. Show them that fishing sector. Have prospects.
Educate people through media more about fisherman
Educate over radio and tv
Educate on TV and radio
Educate more on social media
Educate more on media, journals and do more meetings
Educate more about fishing sector .
Educate more about fisheries sector.
Educate more
Educate more
Educate kids at school .
Educate at youth council and schools
Educate at school or NYC
Educate at school on this main topic fishery
Educate at school level and do session or programme on tv
Educate at school level
Educate at school level
Educate at school level
Educate at school for post segondary
Educate at school but most boys will be interested

Figure 17. Extraction from fisher's responses showing education priority.

3.10.3 Training

Training, which may be combined with education into a larger area of interest has been highlighted by a number of respondents. The arguments centre around training being key to bringing fishers in to the industry, not just artisanal fishing but into other sub-sectors and particularly those such as the industrial and semi-industrial fishing sub-sectors where fishers do not have specific experience and fishing is currently dominated by foreign fishers. Training is also of key importance to other sub-sectors and not just fishing, but processing

The use of apprenticeships, possibly with additional government aid, to fill some of the more technical gaps in related sub-sectors as a form of long-term training is also an option that needs careful consideration. These could fill identified gaps of a few critical workers such as those related to mechanical or electrical engineering, ice plant and cold storage maintenance, mechanics required to maintain the production lines in processing plants. There is not the demand for a specific course to be run each year at the Maritime College or anywhere else, but a small number of people, working alongside existing staff and learning “on-the-job” would be a good way to maintain and expand these critical roles.

Under the sustainable fisheries partnership agreement between the Republic of Seychelles and the European Union it is stated that “each purse seiner shall take on-board during its trip Seychelles’ waters at least two qualified Seychelles seamen”. Given the total number of Seychellois reported in the purse seine fishery is much lower than this target there is potential

to train and deploy these fishers within the fishery. Assuming there are between 40 and 50 purse seiners in the fishery, depending on the outcomes of the ongoing yellowfin quota discussions there is potential for approximately 80-100 purse seine fishermen in this fishery, assuming that Seychelles flagged vessels hold to the same minimum levels.

3.10.4 Love of fishing or the environment

Another factor linked to education and training, but broader than this, was that fishers do not think that the Seychellois youths are in tune with their environment as much as previous generations. Several respondents indicated that there is "no love" for fishing or possibly the wider marine environment. Without this instilled in them from an early age, they are unlikely to want to pursue careers in fishing or the wider sector.

It has been noted that, the health and safety aspects of working in the fisheries sector, which is known to be high risk, may be discouraging to potential recruits. It would be important therefore, for fishers especially artisanal to be appropriately trained, registered and have access to support to ensure they meet defined standards for safety at work.

3.10.5 Government grants / aids

Government assistance in the form of grants or loans targeted at young fishers. This could include grants for vessels, gear, extended training etc. There has been a number of funds such as the Youth Enterprise Scheme (YES) at the disposal of the youth but to be certain that they have the intended outcomes. The government should review funding opportunities for young fishers, which could be to support for apprenticeship programme or funds to established fishers for replacement of vessels etc or financial support, may deter young entrants as they would, even if trained, lack the financial backing to enter the fishery themselves. Directed grants for training courses may also be of benefit for example to be trained as fishing masters or in fish processing. In addition, public partnerships in apprenticeship training should be widened further to support the youth to enter the sector. This is now only done through the Seychelles Maritime Academy. Access to credit facilities for upgrades to boats and for safety equipment should be available to address concerns over safety.

3.10.6 Marketing

Marketing of the Seychelles fisheries was highlighted as a weakness that could be exploited. It was pointed out by several fishers that a few key processors controlled the market and set the prices for the sector. Fishers thought they could do with a better deal and the financial benefit could entice more young recruits into the industry. Centralised government marketing of a branded Seychelles product could be an option similar to the tourism sector. This maybe could include Marine Stewardship Council[30] certification for fisheries or Aquaculture Stewardship Council[31] for aquaculture products. Seychelles fisheries outputs are not enormous hence, targeting niche markets should be a prefer strategy linked to certification to increase value and recognition.

3.10.7 Investment

Several respondents from the fishing sector noted that the provision of direct investment in the fishing sector for young entrants would be beneficial.

[30] Marine Stewardship Council www.msc.org

[31] Aquaculture Stewardship Council www.asc-aqua.org

3.10.8 Drugs

Several respondents noted negative factors that could stop youth entering the fisheries sector. Nearly 5% of respondents indicated that drugs played a part in lack of recruitment into fisheries. Fishing is both a highly physical and high risk business, particularly where safety issues are not adhered to and one that does not align at all with drug use. Respondents indicated many young people would not consider fishing and those that do are money not career driven. This money would then be used to spend on drugs. We cannot comment on the rate of drug use or the overlap with the fishing industry, only comment that it is perceived as a problem by those already in the industry and a barrier to recruitment of youth into the sector. It is largely for this reason that divers in sea cucumber fishery are mostly migrant workers.

3.10.9 Other opportunities

One of the simplest factors in not being able to recruit people into the fisheries sector is the increasingly wide range of other opportunities that are available to Seychellois. Seychelles holds the enviable position of having the best system in Africa and is “It is the first and only country in Africa that has fully achieved the “education for all” goal, set by UNESCO”. It has a better education system than several European countries. This does have the unfortunate results that many Seychellois have higher expectations than previous generations and when this is combined with the increased mobility within the job sector overall does not result in the fisheries sector being one of the more popular opportunities. Many young people are likely not to see, primary industries such as fishing and agriculture as being a likely career path for them and look to other less physically arduous sectors for employment.

3.11 Geographical Distribution of Industry

Focussing on the current geographical distribution of fisheries sector workers in the Seychelles, artisanal fishers are geographically ubiquitous throughout the Seychelles. Figure 18 depicts the distribution and composition of fishery sector by sub-sector at each landing site. The most highly represented sub-sectors are;

- Activities of business and employer’s membership organisations (9400);
- Cargo handling (5224);
- Marine fishing – Artisanal (0311D);
- Marine fishing – Semi-industrial (0311C);
- Processing and preserving of fish, crustaceans and molluscs (1020);
- Sea and coastal passenger water transport (5011);
- Service activities incidental to water transportation (5222); and
- Others.

‘Other’ sub-sectors include; Activities of extraterritorial organizations and bodies (9900); Botanical and zoological gardens and nature reserves activities (9103); Building of pleasure and sporting boats (3021); Building of ships and floating structures (3011); General public administration activities (8411); Manufacture of vegetable and animal oils and fats (1040); Marine fishing - Invertebrates- Lobster (0311E3); Marine fishing – Invertebrates - Octopus (0311E4); Marine fishing – Invertebrates - Other (0311E5); Marine fishing – invertebrates – Sea cucumber (0311E1); Marine fishing – Longline (0311B); Marine fishing – Purse seine (0311B); Marine fishing (0311); Other amusement and recreation activities (9329); Other professional, scientific and technical activities (7490); Processing and preserving of fish, crustaceans and molluscs (1020); Repair of machinery (3312); Repair of transport equipment, except motor vehicles (3315); Restaurants and mobile food service activities (5610); Retail sale of food in specialized stores (4721); Retail sale of Sporting Equipment in Specialised

Store (4763); Sea and coastal freight water transport (5012); Sea and coastal passenger water transport (5011); Wholesale of food, beverages and tobacco (4630).

Mahé Island represents the largest diversity of fishery sector sub-sectors. Only on Mahé Island are workers employed in Cargo handing (5224); Processing and preserving of fish, crustaceans and molluscs (1020) and Service activities incidental to water transportation (5222). Workers from the Cargo handling (5224) sub-sector are localised to English River (LS – ER). Workers from the Processing and preserving of fish, crustaceans and molluscs (1020) sub-sector are localised to Victoria (LS – VIC); Providence (LS – PRV) and La Passe (LS – LP). Workers from the Service activities incidental to water transportation (5222) are localised to English River (LS – ER); Victoria (LS – VIC) and Cote D'or (LS – CO).

Figure 18 shows the scaled frequency of fishery sector works by sub-sector at each landing site. It can be concluded that the largest proportion of fishery workers are employed within the Processing and preserving of fish, crustaceans and molluscs (1020) sub-sector, totalling at 2226 workers. Figure 19 further shows the spatial predominance of Marine fishing – Artisanal (0311D) over Marine fishing – Semi-industrial (0311C), particularly in Praslin and La Digue where workers are only employed in the Marine fishing – Artisanal (0311D) sub-sector.

A large proportion of these workers likely representatives of the Indian Ocean Tuna Ltd (IOT) tuna canning plant in Victoria. In comparison, only 104 workers are employed within the Activities of business and employer's membership organisations (104) sub-sector, 40 of which operating out of Anse Kerlan (LS – AK). Other landing sites where workers are employed within the Activities of business and employer's membership organisations (94) sub-sector include Roche Caiman (26 workers); Flying Deutchman (20 workers); La Retraite (8 workers) and Anse le Mouche (10 workers).

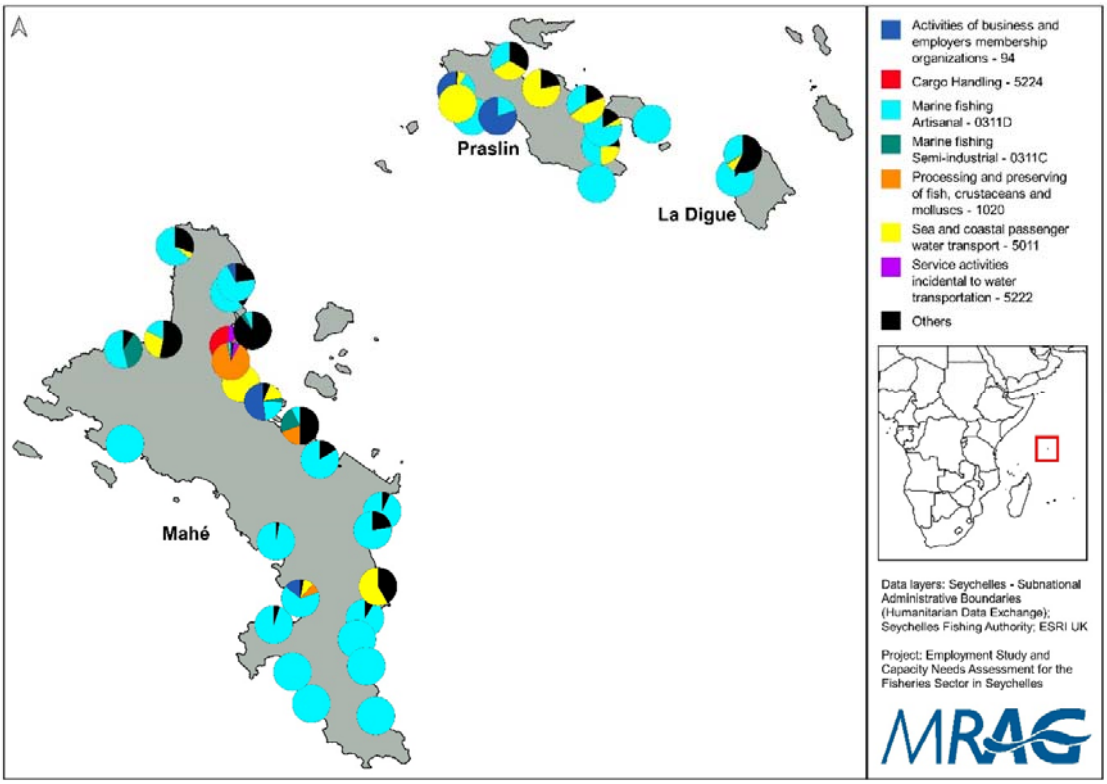

Figure 18. The distribution and composition of fishery sector workers by landing site.

The landing site that facilitates the largest number of marine fishing, both artisanal (0311D) and semi-industrial (0331C), workers is Bel Ombre (LS – BO), totally at 121 and 82 workers respectively. Another landing site of importance for the marine fishing and semi-industrial (0311C) sub-sector is Providence (LS-PRV), where 93 individuals are employed. This contradicts with other surveys, but for instance when compared to the census employees would here have indicated their residential address in Victoria. Providence is however the business base and where the employers, i.e. the semi industrial vessels are registered in this report and may include the workers registered in Bel Ombre. We have to note that the SFA database on fishers and operators also reference residential address and not operating location of fishing vessel.

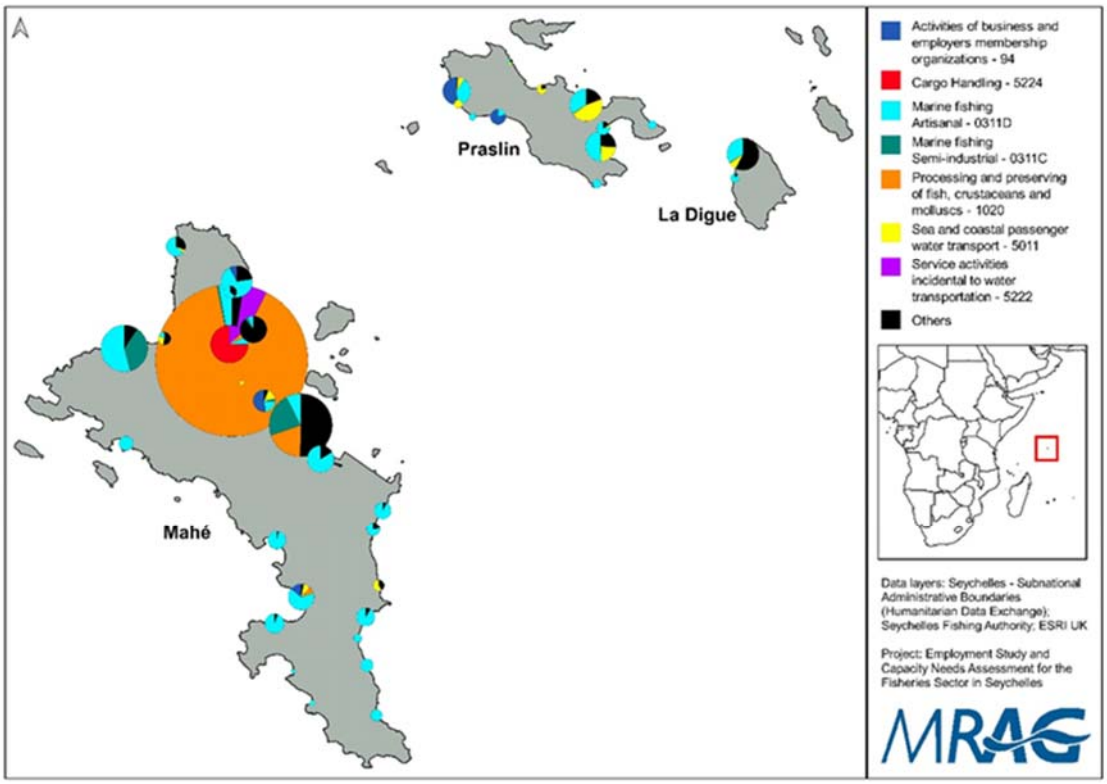

Figure 19. The breakdown, distribution and scaled frequency of fishery sector workers by landing site (n = 4314).

Looking into the future and trying to predict where industry is based, we would expect the same patterns to be followed, with artisanal fishers being distributed around Mahé, Praslin and La Digue, but with the associated industries concentrated in Victoria (including the Ile de Port, recently identified as a new fish processing zone for industry[32]) and Providence. It is important for fish processing facilities to have direct access from docksides where catch is unloaded and be able to have other related industries and facilities (e.g. centralised cold storage, electricity substations and fresh water, ice and sewage plants) in close proximity. This is to ensure that the hygiene and health requirements are maintained at the highest levels to allow export and maximum income generation. Creating zones dedicated to these activities is therefore critical and the areas of industry developed in Victoria (including Ile de Port) and Providence clearly allow for this. The difficulty is identifying the volume of fish that will pass through these centres.

[32] https://sbc.sc/news/seychelles-marks-out-new-fish-processing-zone-for-private-industry/

One particular exception to be noted is the development of prawn aquaculture on Coetivy Island. This has been recently identified as the most suitable site in Seychelles for commercial prawn farming. The required features for prawn farms are still available from the previous farm. It was noted by the Chief Executive of IDC, that although Seychellois will manage the project, foreign experience labour possibly from South East Asia will need to be brought in for the labour intensive elements of managing the farm with additional expertise from the previous company who ran the farm. It is assumed that all the related processing will be conducted on site.

3.12 Make recommendations and identify approaches for the systematic collection of employment data in the sector (Task 13)

The long-term objective is to ensure that employment data, similar to that collected through this study can be collected on a regular basis. This would provide the Seychelles, through SFA or any other agency, the ability to analyse the data collected over time.

Key indicators (or more appropriately sets of indicators) can be developed based upon this study and can be tracked over time. A provisional set of indicators is described in Table 13. The data required to be collected to calculate these indicators, the methods required to collect these data and any relevant requirements to statistical robustness have been developed into a series of recommendations.

Additionally, recommendations would then be developed that would relate to the mechanisms around data collection, data storage and analysis. Where these have been automated or may require manual importation and data cleaning will be indicated.

Under the project, a database to store and analyse the long-term data has been developed. This is a series of Microsoft Access databases with different functions:

(i) to edit the data;
(ii) to store the data; and
(iii) to analyse the data.

The majority of the data are systematically collated using a Lime Survey[33] questionnaire tool. This is currently maintained on a dedicated MRAG survey server for security reasons. The details (i.e. structure and content) of the survey match the questionnaires provided as Annex 2 – Annex 4. These structures can be exported and subsequently imported on another instance of the Lime Survey server which we would recommend to be hosted at SFA. The structure and all associated data will be provided as part of the project. Data for employees can be entered through the web-based interface for up to ten employees or through an attached Microsoft Excel workbook for over ten employees, i.e. the larger employers.

Fisher data were collected using an Android application (app) for mobile phones, developed using the open data kit suite of tools to create a survey in an android phone app that can be used to collect data and submit to central a server to collate all the surveys. The survey was first designed using a ODK form designer called ODK Build http://build.getodk.org. The form was created using a drag and drop interface to create the questions, and answer options. Once the survey had been designed, the form is exported from the ODK Build as an XML file ready to be uploaded to a server for data collection.

An MRAG web server was configured to be used with the phone app using the ODK Aggregate https://docs.getodk.org/aggregate-intro/ java application. The Aggregate application stores the ODK forms online by uploading the XML file generated by the ODK Build tool and makes

[33] https://www.limesurvey.org/

the form available to be used to collect data. To use the form a data collector first downloads and installs the android ODK Collect app https://docs.getodk.org/collect-intro/ onto their phone or tablet. Once the app is installed the form can be downloaded, using the URL of the server with the ODK Aggregate application. After downloading the form the data collectors were then able conduct the surveys either online or offline

As for the lime survey the source code and data for the app will be provided as part of the project deliverables.

Both these datasets can be imported direct into the Microsoft Access database used for storage which also contains all the lookup tables required for the database management. Database tables have been developed to use all relevant standards including:

- Age standard (based on Seychelles statistical groupings)
- International Classification of Status in Employment 93 (ICSE-93)
- International Standard Classification of Occupations (ISCO) codes
- ISO 3166 Country codes
- International Standard Industrial Classification (ISIC) codes
- International Standard Classification of Education (ISCED) codes
- Location codes (based on island and landing location as used by SFA)
- Wage bands (based on established Seychelles statistical groupings)

We would recommend using these standards wherever possible, including ISCO codes for recruitment and job supply data. We however noted local differences to the standards, e.g. wage bands and educational levels at the draft stage of the questionnaire development when these were discussed with the project steering committee that including key personnel from SFA and the NBS.

We would however recommend restructuring the wage band data. As these data are not unform in size and cover wide ranges it has not been possible to calculate average earnings to any degree of certainty due to the wide ranges and probable clustering and bias within the bands. An increased number of wage bands on a regular distribution would give more credence to any statistics based on these figures. The same could be applied to age bands but as these are used a classifying factor in any analysis and wages are used as the factor being analysed more often than not in comparison to other factors this is not critical.

Two other Microsoft databases have been developed firstly for simple data entry and editing where required for the key data tables and secondly for analysis and data cleaning.

Data analysis is spread between Microsoft Access and the statistical package R. Microsoft Access is used to analyse the data collected and create a static dataset that all subsequent analysis is run from. This dataset is used as a data source for the queries in Access to generate many of the tables shown in this report and also exported into a MS Excel worksheet to be used by R or non-database users. Although R can use datasets in MS Access directly, it is more common and more familiar to users to use MS Excel and the “read_excel” function to import data.

A standard naming convention has been used throughout most of the database and R code for each analysis so that the database query and R output graphic share the same name. The same R code can be used a number of times on different datasets to provide comparisons between them, just the input file needs to be changed in the code.

All the databases and R code have been provided as project outputs.

A summary table of the key indicators developed through this study with additional recommendations for future work can be found in Table 13 below.

Table 13. Summary table of key Indicators developed through this study with additional recommendations for future work associated personnel and potential capital and time inputs required.

Indicator	Monitoring Purpose	Personnel	Time Inputs	Capital Investment
Proportion by nationality in fisheries sector (and each sub-sector)	Use of foreign labour in the overall fisheries sector (and within each sub-sector over time as further data are collected)	IT staff to setup servers and develop phone app / survey if modifications needed. Regular 2 or 5 year updates. Approximately US$15,000 to collect all the data required.	Setup of Lime Survey on SFA server – Minimal <1 day Training on Lime Survey and Phone App Development Software – approx. 5 days.	Setup of Lime Survey on SFA server – Minimal (<US$1000 for hardware and software is free to use). Training on Lime Survey and Phone App Development Software – Minimal but would depend on number and sophistication of the changes required.
Proportion by gender in the fisheries sector (and each sub-sector)	Gender balance in the overall fisheries sector (and within each sub-sector over time as further data are collected)			
Total number of employees and FTE in the fisheries sector (and each sub-sector)	The overall size of the sector and importance in terms of the overall Seychelles economy.			
Wage structure band)	Provides estimates of changes in wages by gender, age, ISIC or ISCO group and by educational level. Provides comparison intra and inter sector i.e. fisheries vs hospitality,			
Age structure	Provides estimates of changes in age structure by gender, ISIC or ISCO group and by educational level. Identifies potential issues in ageing population of a sub-sector.			
Total number of artisanal, semi-industrial and industrial fisher and target species	Total numbers of fishers. Real-time record of fishers to be maintained at SFA. Updated at least every two years. Provides survey rates ground-truthed by real time data.	IT Staff to develop database tables. Data collectors to populate.	Setup of Lime Survey on SFA server – Minimal <1 day	Minimal
Total number of companies by sub-sector	Record of all companies in each sub-sector of the fisheries sector. Provides established frame for statistical reporting of data collection. Provides survey rates ground-truthed by real time data.	IT Staff to develop database tables. Data collectors to populate.	Setup of Lime Survey on SFA server – Minimal <1 day	Minimal

4 Impact of COVID-19 on the Seychelles Fisheries Sector

In the early phase of the pandemic in April 2020, there were general statements from the Food and Agriculture Organization of the United Nation (FAO) about the economic and social impacts of the disease on the fisheries and aquaculture sectors of economies worldwide. They noticed a general reduction of the fishing activity up to a cessation of operation at the fisheries in some States. The FAO gave recommendations, how the impacts shall be mitigated, such as grants to cover losses, transparent quota systems, minimum floor prices, credits or exploring new markets (FAO 2020a). It is clear that in economies such as the Seychelles, that have a high level of GDP coming from the fisheries sector, the effects of reductions or cessations in activity would be harder felt and mitigation measures may need to be targeted at the sectors most affected.

Another FAO-Report from May 2020 reported on questionnaires directed at fisheries management organizations and fisheries advisory bodies about the impact of employers in fisheries and aquaculture, impacts on monitoring activities, planned or undertaken mitigation measures or the demand or price for fisheries products. They found that the most organizations assume, that COVID-19 will have negative impacts on the fishery management and on MCS. The surveyed assumed, that the employers in the fishery would be most affected, but the employment in the aquaculture will be less affected, because there is still a need of care to the fish stocks (FAO 2020c).

In June 2020, the FAO produced another publication, a worldwide overview about the impacts on the pandemic on fisheries and aquaculture up to that point. They found, that the COVID-19 caused a disruption in all segments of supply chains. The fishing activities decreased because of several reasons, such as closed markets, closed HORECA (Hotels, Restaurants and Catering) sector, which in addition to fisheries is an economic sector of critical importance to the Seychelles economy, or difficulties in working activity caused by increased sanitary measures such as social distancing. At the end of April, the worldwide commercial fishing activity reduced about 6.5%. Processors and traders and the food service sector were reported having to find new supply chains as delivery service or direct sales. The workers along the supply chain lost their jobs, are often migrant workers, who could not cross the borders or had to face high sanitary conditions or a higher risk of infection. There was no conclusion in this paper except for the intention of the FAO to support and strengthen the sector (FAO 2020b).

A report from the OECD in June 2020, confirmed the observation of the FAO on the fisheries an aquaculture sector in the world. They added that the prices were reduced or more volatile and the pre- and post-production handling like port operations or inspections became more difficult. Moreover, they speculated about the chances of new distribution models, if the impacts of the crisis on the natural resources or the impact on the food security, but the main effects are still unknown. They suggested that the police support in future shall support sustainable fishing, but shall also give direct or indirect financial support to the fisheries (OECD 2020).

The dual impact of COVID-19 on fisheries and HORECA sectors on the Seychelles economy makes the understanding of the pandemic important to allow government and industry to firstly navigate the current pandemic but also increase preparedness in the case of future waves or new pandemics. In this section, we look at the impact of COVID-19 on business, the effectiveness of mitigation measures, as received by the sector and the sector's views on how COVID-19 has affected productivity.

The Seychelles fisheries sector, in particular the artisanal and semi-industrial sectors, experienced severe difficulties with an abrupt decrease in exports and local fish consumption. These were due to a lower number of tourists arriving in the country and the cancellation of

flights. The industrial sector was not affected too much, except for crew repatriation and crew changes. The risk of an infected incoming crew member coming into contact with the local population or onboard vessels were huge concerns. Protocols were put in place by the Public Health Authorities to mitigate against community transmission. Despite these measures, on several occasions, a number of purse seiner vessels had to undergo quarantine periods because of incoming crew testing positive for the COVID-19 virus.

The semi- industrial sector, which exports approximately 90t of fresh tuna per month, had to cease fishing operations since most of the export markets were not available due to flight restrictions to destinations in Europe and the United States. Most of the foreign crew were repatriated to their home countries as there was a complete halt in the fishing activities of this sector. The semi-industrial sector had to apply for support under the Government's COVID-19 financial relief programme.

The artisanal sector was also affected due to reduced market opportunities to sell their catch. A special programme was put in place whereby processing plants were encouraged to buy and stock the fisher's catch. Price limits were set for the main fishery products to ensure that fish was affordable during the period, but the fishers also received adequate income. The processing plants participating in the "buy and stock" fish programme was provided with a soft loan of SCR 1 million to assist with the cash flow needed to purchase fish from the artisanal fishers. On Praslin and La Digue, SFA was to buy all the fish and then sold it off to Seychelles Trading Company (STC). The price of ice was also subsided to a price of 10 SCR and 15 SCR per 25 and 50 kg bag, respectively. The cost of bait was also reduced from 15 to 5 SCR per kg.

The canning factory, one of the largest employers in Seychelles did not experience a downturn in their operations but recorded increased sales due to the increasing demand of canned tuna products in Europe as local problems in fresh fish supply impacted supply chains there.

The Seychelles industrial longliners, whose major market is Japan, encountered limited cold storage space as stock in storage increased because of the reduced demand and prices in Japan leading to fewer exports.

4.1 Impact of COVID-19 on business

The Seychelles fisheries sector were asked to report on the impact of COVID-19 on their business. Respondents were asked a simple question as to whether the COVID-19 pandemic had impacted their business and to what extent the pandemic had had on their operations as a percentage of business lost. Table 14 and Figure 42 in Annex 1 show that approximately two thirds of all respondents (and >80% of those who expressed a view) to this question noted negative impacts to their business. In terms of the percentage loss of business there is a clear spread across the entire sector, with some businesses not impacted at all with 0% loss, but others with 100% loss and not able to operate during the pandemic.

Table 14. Respondant answers to COVID questions

Response	Count	Percentage (of those that responded)
Has COVID-19 impacted your business?		
Yes	428	81.68%
No	96	18.32%
n/a	116	22.14%
Have the adaptive measures produced by the Ministry of Employment such as the new GOP framework and other employment programs (URS, MFJ & SDP) mitigated some of the negative effects of COVID-19 on the workforce?		
Yes	179	41.34%
No	254	58.66%
n/a	207	47.81%
Has the Fisheries Emergency Plan produced by the Fisheries Department reduced the negative impacts caused by COVID-19?		
Yes	260	59.50%
No	177	40.50%
n/a	203	46.45%
Has COVID-19 impacted the productivity of the workforce?		
Yes	294	60.49%
No	192	39.51%
n/a	154	31.69%

A comparison of the percentage loss in business due to COVID-19 can be shown for different sub-sectors (Figure 20). Here it is clear that transport has fared poorly with large losses, but the technical service related companies have been able to comntinue trading with little or no loss.

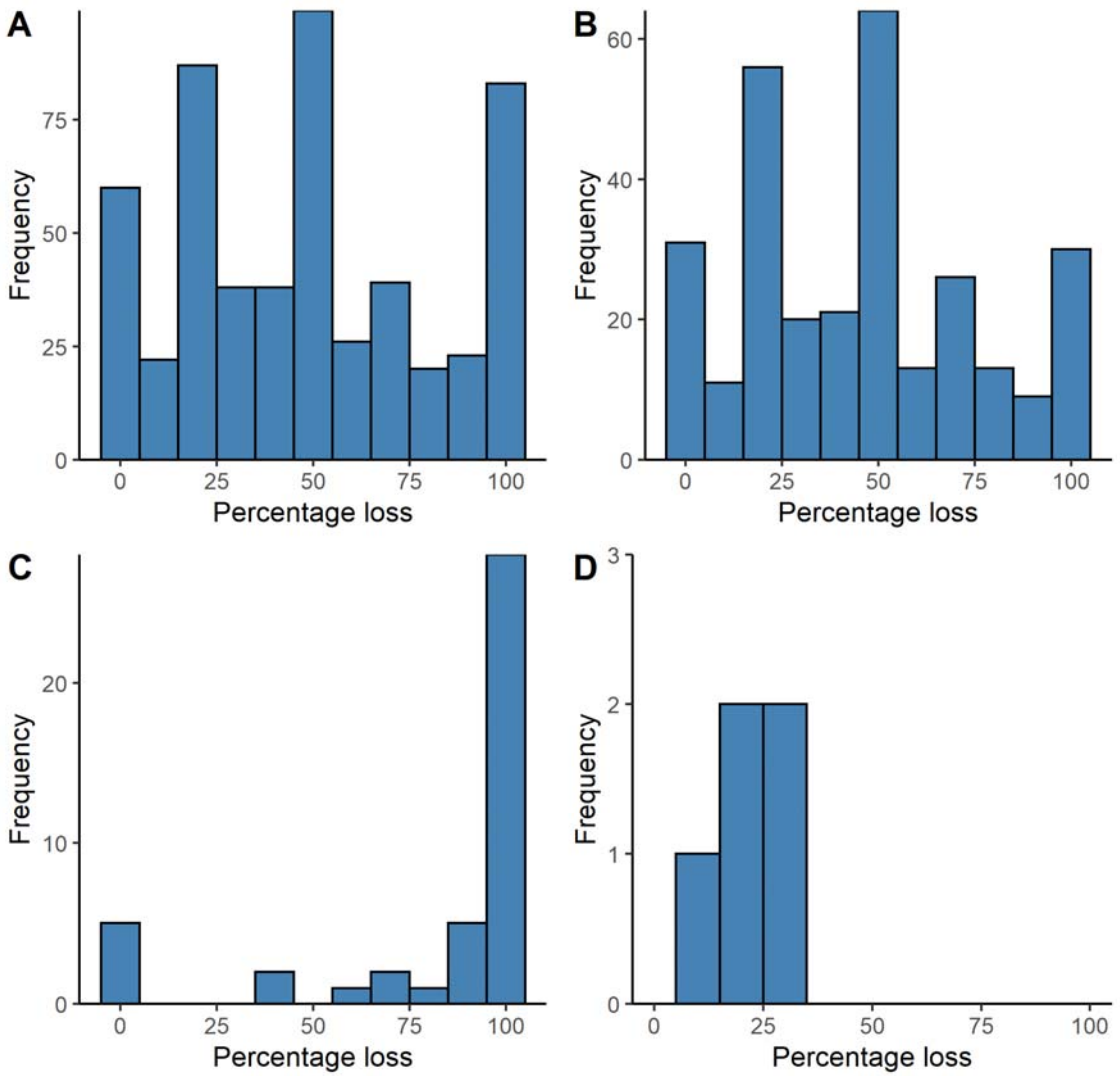

Figure 20. Percentage loss estimated due to COVID-19. A) all respondents, B) artisanal fishing companies, C) maritime transport companies, D) professional, scientific and technical companies

A number of impacts from the COVID-19 pandemic have been highlighted by the respondents. Most of the impacts describe a reduction in the ability to catch and sell their fish. Traditional supply chains and markets for their fish have been significantly reduced (e.g. loss of HORECA sector, local markets not open or selling as much). Some local fisheries have maintained their current supply chains where they sell to the domestic maerket, but for others reliant on other markets, their markets have gone completely. Opportunities have been recported to have improved when export channels opened up after the first wave. Artisanal and small-scale fishers are also now opening up new supply chains by using vehicles to sell their catch more, instead of people coming to them.

Some fishers have indicated that they are selling their boats, switching to other industries e.g. a small number indicated a switch to agriculture. Redundancies have been observed in associated sectors. Boat charters have lost their client base. As their clients have stopped coming in numbers they have no income.

One sector that may have benefited or impacted less than others is the boat yards for maintenance. One respondent noted that his income has increased 10% during COVID-19, since the fishermen who are not going fishing have brought their boat to his shipyard for repair and maintenance. However, imports are expensive at the moment and they are critical for the maintenance of boats and gear This is in part due to the lack of transport options and the change in the exchange rate between the Seychelles Rupee and the United States Dollar (see Figure 21). Respondetns also noted the fuel price has increased making any fishing activities more expensive than before in a difficult market.

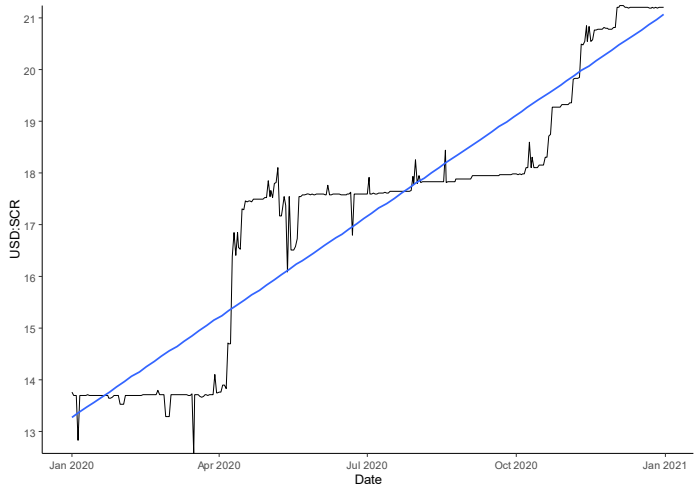

Figure 21. Exchange Rate USD : SCR during 2020.

Source: www.exchangerates.org.uk (Data downloaded 05/02/2021)

Respondents also expressed concerns about securing business moving forward. Some boatowners are questioning whether it is best to sell up now while they can get a reasonable price for the vessel or try to weather the storm and recover after the pandemic. Those that are staying in the industry are also finding it hard to secure loans, as the future is not looking good for them or at best unclear and many lenders do not want to invest in the fisheries sector in this current situation. Companies are struggling to pay their current loans. Plans to upgrade to larger boats have been delayed or loans reduced, delaying improvements.

A small number of respondents suggested that the semi-industrial fishing likely to be most impacted, though this cannot be verified. Most respondents thought that it will take two years for the sector to get back to normal, i.e. when all sectors have returned e.g. tourism. The world cloud generated from the sum of all repsonses (equally weighted) shows a leaning towards the current and future financial implications with clear highlighted words such as “sell, revenue, affected, income, now, future, work, price and market” clearly important and upmost in the thoughts of those impacted. (See Figure 22).

Figure 22. Word Cloud of COVID-19 impact responses.

4.2 Effectiveness of government responses to COVID-19

As indicated early, in response to COVID-19, two mechanisms were put in place by the Government of Seychelles, a general response by the Ministry of Employment that is open to all and a specific Fisheries Emergency Plan (FEP) that included fisheries related measures such as ice being sold at half price, cessation of tuna longline fishing, a reduction in the price of bait (to 5 SCR / kg), a standard price for bourgeois at SCR 65 / kg, support to longliner operators (e.g. crew repatriation or salary support), arrangements relating to the purchasing of fish by processors and retailing by STC (including storage). Respondents were asked if they thought each of these were beneficial to their particular situation.

From a simple comparison of the two plans it is clear that those in the fisheries sector are more positive about the FEP, 60% positive responses (of those who responded to this question) (as shown in Figure 42) compared to the more general set of measures implemented by the Ministry of Employment that only 40% (of those who responded) responded positively (Figure 42). This clearly shows the need for tailored responses to critical sectors such as fisheries that meet the needs and nature of that sector directly.

On the programme of measures implemented a number of common responses were given by the fisheries sector:

Self-reliance	Many users did not see the need to apply.
No response	Many respondents had applied for funding but had not (at the time of completing the questionnaire received a response or funding. Others indicated by the time they did receive a response their workforce had moved to other jobs.
Bureaucracy	Some respondents indicated difficulties with applications (e.g. bureaucracy involved was too much in their view and the process too long and too complicated) and implementing the measures for a number of reasons including use of foreign workers, casual workers and a lack of awareness from some as to what they can and cannot be entitled to.
No fishing	Respondents who have received funding, just rely on that and do not go fishing at the time.
Focus wrong	Some respondents indicated that they thought it wrong to support larger businesses in the same way as smaller business that they thought would struggle more and needed more support.
Specific support	Some associated (non-capture) sectors noted assistance had been received e.g. “Received assistance from the URS program. Difficult to get qualified staff to work in laboratory” and “Although, there is a recruitment freeze in government, we are able to acquire additional manpower under the internship scheme”.

Similarly, for the Fisheries Emergency Plan, respondents commented as follows:

Beneficial	Actions of the FEP are generally of more benefit to the fisheries sector than the general adaptive measures e.g. “it was such a good initiative done by the SFA to help out the fisherman”, though many respondents only used some of the benefits e.g. bait or ice where required. Others reported although beneficial larger negative impacts on the sector are greater than the benefits from the FEP, e.g. lack of HORECA sector to sell into or the cancellation of international flights used for exporting fish, increasing supply to the local market.
Bait	Generally, bait price reduction appreciated, but many responses indicated that they could not get bait regardless of price and some reported bait still being sold at SCP 15 / kg and not SCP 5 / kg.
Fuel	Fuel connections was useful but with fuel price increases some respondents noted fuel was the biggest problem during COVID-19.
Bureaucracy	As for the adaptive measures above, some respondents claim the level of bureaucracy involved was too high. The organisations involved “must do more” and “because you need to wait a long time to receive and gain what you need”.
Focus wrong	As above, some respondents indicated that they thought this supported larger business more than smaller businesses or independent artisanal fishers.

Some respondents to the questionnaire noted that they had been visited by the Seychelles Tourism Board[34] (*STB*) and that if they attended a course for COVID-19 and were to receive a certificate that the STB would assist to pay licence fees. This would enable them to start operating their business again. It is often small but noticeable actions such as these that enable businesses to carry on or reopen after a crisis.

[34] www.seychellestourismboard.travel

4.3 COVID-19 related impacts on productivity

Respondents were asked their views on productivity of their staff during COVID-19. Results were not as clear as other COVID-19 related questions with a small majority (approximately 60% of those who responded to this question) reporting that COVID-19 has had a negative impact on productivity levels of their staff, with a drop in motivation and lack of support from government, although it was clear that other respondents (approximately 40% of those who responded to this question) indicated that there was no drop in productivity from their workforce (see Figure 42).

Many responses indicated that safety concerns over working conditions were initially high in workers' minds, but this appears to have recovered as time progressed and concerns were allayed. Loss of earnings, was a primary concern, as businesses reduced hours or stopped working and a number of respondents indicated that even when fishers caught fish, they were disappointed at the lack of sales opportunities, possibly due to the reduction in the HORECA sector. Companies reported workers leaving their fisheries related jobs and finding work elsewhere and smaller companies considering closing down and where they continued the drop in productivity was noted. Some differences between artisanal and commercial operations were noted, with some artisanal fisheries noting that their customers were still buying fish through their normal channels but for the commercial businesses additional problems such as delivery of fish to the processors was delayed, fish needed to be kept on ice for a longer period resulting in a reduction in the market price.

Some sub-sectors indicated supply problems, e.g. from the maintenance sub-sector it was reported that "Boat charter and spare parts are not available to import or on market due to COVID-19" and "No tourist and no boat charter and spare parts for repairs and maintenance of boats". These impacts could over time have significant knock-on effects on the fisheries, sport fishery and other downstream sectors if they continue.

Impacts on the operations of foreign flagged vessels operating from Victoria were also noted. Some of the distant water fleet activity has continued relatively unaffected, with some extra restrictions placed on vessels operating on the Indian and Atlantic Oceans by their own flag States. Vessels identified with COVID-19 positive crew onboard were required to remain in quarantine in port until given medical clearance (e.g. Spanish vessels in Seychelles[35]). Crew rotation for these fleets was impacted, with restrictions on air travel, longer rotations and clearance needed with self-isolation in port before joining the vessels. This would impact their time at sea. However, it may not have impacted the annual overall catch as they could have fished out their fishing opportunities (e.g. purse seiners in the Indian Ocean) during the reminder of the year when normally they would have been required to stop fishing as having reached their agreed limits. Fortunately, crew changes do not require prior vaccination to transit through the Seychelles, only a negative PCR test. Crew movements are limited to embarking and disembarking the vessel only and once the incoming crew are onboard the vessel has to depart.

35 http://www.seychellesnewsagency.com/articles/13107/+crew+members+of+Spanish+fleet+in+Seychelles%27+waters+test+positive+for+COVID-

5 Discussion and Conclusions

5.1 Policy and Legislation (Task 14)

Seychelles' fisheries encompass a wide range of fishing types from artisanal activities (e.g. line, trap and net fisheries, diving in sea cucumber fishery), through semi-industrial longline fisheries to industrial purse seine and longline fisheries. These fisheries variously service domestic and export markets. Increasing value-added elements to the fisheries is seen as a way of creating revenue growth in fisheries, some of which are already heavily fished and so have limited capacity for growth in catches or may even require a long-term reduction to ensure sustainability and maximise economic returns. People are employed in the various fishing related sub-sectors, e.g. processing, marketing, support services (e.g. stevedores, ice and fuel provision, boat building) and administrative elements (e.g. licensing, control and enforcement, management). Not all positions in each of these areas are occupied by Seychellois, and foreign workers are often involved as a large proportion of the workforce across the sector including as crew on fishing vessels and at processing plants.

The diversity and complexity of employment within the fisheries sector raises a number of policy challenges, amongst others:

- What are the human resource capacity needs in the different elements of the fisheries sector?
- Can capacity needs be met locally?
- Should controls be placed on non-local labour if it is disrupting the local economy (employment, wages, recycling of funds within the local economy)?
- Are the rights of non-local labourers being respected?
- How are men and women represented across the different components of the sector and are they treated equally (e.g. hours of work, pay)?
- What proportion of time are people employed in the sector – can this be increased; can alternatives be found?
- Where and how should future investment in the sector be targeted?

The 2019 Fisheries Policy addresses the issue of training and employment through a goal calling on the "*Government to intensify its effort to provide for the upliftment of young people and woman as entrepreneurs across the value chain by using appropriate support mechanisms, education, training and institutional strengthening to encourage them to join and develop a career in the sector. Re-skilling and high-level training will be promoted in order to stimulate innovation and adapt to new technology and scientific advances*".

The Policy further acknowledges that employment in the sector is of grave concern and lists 13 strategies to address this gap. From a policy perspective, the Fisheries Policy of 2019 addresses the major areas for intervention adequately and our approach here is to develop these strategies further by providing practical actions based on our analysis that can be addressed in the short or medium term.

Most of all the fisheries sub-sectors employ number of persons below fisheries graduate level Such persons are often termed as technicians or skilled and semi-skilled staff. This category includes diploma holders, vocationally trained and other educated persons trained on the job. It clear from the analysis that technicians are often lacking in the sector.

The Small to Medium Enterprise (SME) Strategy and Policy indicated the need to develop a strategy on entrepreneurship education by the Ministry of Education and Human Resources Development (MEHRD), which should cover all levels, from primary to tertiary. The National Development Strategy (NDS), in support notes that the "education system needs to be reformed in order to ensure that it becomes more responsive to needs of the economy, both

in terms of content and quality, e.g. by adapting the curriculum to emphasize acquiring skills that will be needed in the socioeconomic transformation agenda of the country". In addition, the MTS 2018–2022 calls for the establishment a TVET and Entrepreneurship Division at the MEHRD and a sub-programme focusing on providing strategic leadership, guidance and support to educational institutions to strengthen the promotion and development of TVET and entrepreneurship. It would seem that the policy framework to address the issue of technical training in place but yet to be materialised.

Development and extension work in the fisheries sector is nearly non-existent. In the recent years a lot focus has been monitoring, control and surveillance, legal and research activities. The Government has also invested in numerous infrastructure elements such as ice plants and processing facilities, but the underlying base of human resources, has not been adequately supported. Capacity development needs will depend greatly on how quickly an improvement is required. With immediate problems that need to be solved quickly, on-the-job training or apprenticeship programmes might be required. For medium / long term improvements, it will be necessary and appropriate to change schools and university curricula or research agendas to gradually build up the necessary capacity to develop the sector.

A number of sectors of the economy employ personnel qualified in fisheries sciences and technology, such as the government departments, private sector including the self-employed, academic and research institutions, processing units, financial institutions, as well as other units of trade and civil society organisations

It very clear based current demand in the sector, capacity cannot be met locally. The SMA graduation rate was 79% in 2019 compared to 59% in the previous two years[36]. Attrition[37] rate at the Seychelles Maritime Academy was 5% in 2019.

[36] Tertiary Education in Seychelles: Indicator Report for 2019.

[37] The percentage of learners who leave their studies before completion.

Table 15. Identified elements of the 2019 Seychelles fisheries policy and related actions recommended through this study.

No.	Key Strategies of the 2019 Fisheries Policy	Recommended Actions
1	Identify the skills gap and capacity building needs to match the demand of the fisheries industry;	This study identified a number of skills gaps that need to be addressed and where those are applicable to Seychellois or immediately by foreign labour to be replaced by Seychellois over time. • Able seaman; • Bosun (deck supervisor); • Semi-industrial fishers; • Divemasters; • Skippers; • Fibreglass plant workers; • Fish processing workers; • Machinists; • Mechanics – Marine; • Technician - Electrical Engineering • Technician - Mechanical Engineering; and • Technicians – Net. Identify and remove any other barriers to career development and growth in the sector (e.g. loans, business management etc). This would need to be addressed by the Department of Employment which may address skill gaps short term by relaxing immigration rules for specialist roles and with the Ministry of Education being involved in developing and delivering training programmes to fill the gaps long-term. The development and implementation of training programmes to fill these gaps will require moderate capital investment, but would long-term reduce the amount of money leaving the Seychelles economy by reducing the level of non-Seychellois involvement in the sector. Two key gaps identified from the data collected include 818 “Other stationary plant and machine operators” (18 Seychellois : 108 Non-Seychellois) and 921 “Agricultural, forestry and fishery labourers” (120 Seychellois : 384 Non-Seychellois).
2	Prepare in consultation with the industry, the Ministry of Education and the Department of Employment, a human	This should identify all the different and diverse opportunities within the fisheries and expanding aquaculture sectors. The SFA should also be

No.	Key Strategies of the 2019 Fisheries Policy	Recommended Actions
	resource training and development plan for career path (vocational/technical/academic) development in the sector;	directly involved in TVET development with fisheries sector well represented during this process. For example this could include vocational training development to enable progression from seaman to skipper and demonstrate this as a clear career pathway. This would have a low level requirement for capital investment and should be included into current career planning at secondary and tertiary education levels.
3	Promote ocean, marine, fisheries and aquaculture related matters in primary and secondary curricula;	Education was the single most recommended factor in engaging with the Seychelles youth and encouraging them into the sector (see Section 3.10.1, though this is counter to the requirements for more unskilled labour). A structured plan of education of ocean awareness from primary to tertiary education with clear links to industry and the way the environment and industry need to work together is key and should be developed by all parties under a clear lead from the Ministry of Education. The involvement of industry through the process will show students the potential for employment in the sector from fishers, to processers and management. This should be linked with a well-defined apprentice programme and career development paths. This will have some limited budgetary implications but once developed can be integrated into existing teaching materials and updated at little capital cost.
4	Enact and implement a commercial fishing boat crewing policy and/or regulation;	Although ideal, at the moment local operators are struggling to retain any Seychellois fishers in the semi-industrial or industrial fisheries (see Section 3.6.4). This requires a long-term approach involving education of young Seychellois that fishing can provide a good income and long-term career, running alongside training developed with local industry to ensure understanding across the sector. It also requires a commitment from the private sector to support an apprentice programme if they would like to recruit foreign workers. The apprentice approach should not be just an attachment, there should be long-term objective and monitoring/evaluation to retain youth in the sector. This apprenticeship and policy would fit alongside the career path development (2 above) and once established would have minimal costs.

No.	Key Strategies of the 2019 Fisheries Policy	Recommended Actions
5	Train existing, new fishers, fish handlers and processors and skilled labour to take up employment opportunities in the sector;	Work with the local fishers to identify the gaps in their related and where these should be met with local workers (particularly where currently occupied by foreign labour). Where training is required, this can be provided by SFA or through the Maritime Academy. It is very evident that there is a mismatch between what the industry needs and what educational system is producing. Training courses should be developed in conjunction with industry with targets set to meet their objectives. The root causes of the skills mismatch need to be identified for the sector. Practical experience, either on board vessels or in processing facilities will be key and will need to be established with all local operators involved. The update and development of training courses by the Ministry of Education and Maritime Academy based on industry needs would have a moderate development cost of between US$25,000 and US$50,000 depending on the number and variety of courses.
6	Collaborate with industry operators on crew training and employment through SFA and SMA;	Work with the industrial fishers to identify the gaps in their workforce and where these should be met with local workers. Where training is required, this can be provided by the Maritime Academy with the courses being developed in conjunction with industry and with clear practical experience on board vessels where possible (e.g. two trainees working on purse seiners operating out of Victoria when appropriate). The approach has been a passive one and may require a more active approach to push youth in the industrial sector. This already occurs but may just require minimal costs for administration
7	Promote job creation through the implementation of a Working for Fisheries Programme and mechanisms to raise the profile and welfare of fishery industry workers;	Focus job creation opportunities on those jobs currently dominated by foreign workers. This is a task for the Department of Employment. These jobs are currently
8	Promote relevant certification of fishers including through the STCW-F training;	The IMO's International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), established in 1978 was the first internationally-agreed Convention to address the issue of minimum standards of competence for seafarers. Updated in 1995, the STCW Convention identified clear standards of competence and effective mechanisms for enforcement of its provisions. The Seychelles should establish a small team that can assist in the implementation of STCW-F (possibly combined with ILO rights below).

No.	Key Strategies of the 2019 Fisheries Policy	Recommended Actions
		This would best be undertaken by the Maritime Academy and may have significant costs to establish initially.
9	Review and enhance the fisheries apprenticeship programme to cater for long-term career development and specialised training (e.g. master fisherman), including extensive sea-going training;	Apprenticeships and targeted vocational training are key to introducing young workers into the fisheries sector and impotently retaining them in the sector. Enabling commitment and some financial support to the trainers and apprentices is critical.
10	Promote arrangements that will support collaboration with the industry, e.g. industrial vessels for the training at sea;	As identified, collaboration across the sector is required for training. Utilising local vessels to educate all those involved in the sector as a training and awareness platform to deploy the correct training for safety at sea is critical.
11	Monitor and develop services to promote accessibility to employment in the sector;	The gaps in the sector particular for engineers (mechanical and electrical) as the sector grows are critical. Reviewing this sort of study in five years, will enable other sub-sectors that require additional trained specialist workers to be identified and training programmes put in place to ensure these are filled with local workers,
12	Promote and implement good practices relating to labour (i.e. ILO Work in Fishing Convention and Work in Fishing Recommendation, 2007 (No. 199)) and working conditions on vessels registered and flying the Seychelles flag, on the entire Seychelles fleet, including industrial longliners in particular;	It is recommended that these elements are included in appropriate places in courses at the Seychelles Maritime Academy. The Seychelles should have a small core team based either in the Ministry or Seychelles Fishing Authority that are trained in the assessment of ILO working practices and work towards improvements within the Seychelles fleet. This could be a continuation of the gap analysis of the ILO Convention work in fishing No. 188 and other national laws, policies and practices already being conducted by the Employment and Fisheries Departments in conjunction with ILO.
13	Promote through the SFA high level training in fisheries science and resource management at the UniSey.	The University of Seychelles should be able to provide high level training in fisheries science and resource management. This could become a regional hub for fisheries training removing the reliance on training in Europe, South Africa or Australia as currently occurs. This is a long term objective but would provide a good supply of qualified students to enter the workforce over time. If just supplying the Seychelles sector the numbers and cost required may not be profitable but if opening up to other countries it may be profitable and feasible, At the start, lecturers to support the course may need to be brought in with additional course elements run by local fisheries staff from SFA.

5.2 Infographics detailing the key results of the study for reporting to stakeholders and decision-makers (Task 15)

A large number of analytical plots have been presented in this report that would be combined and used in presentations (see also Annex 1).

These have been developed to best get the information across to a wide range of stakeholders, allowing the messages to be delivered simply and easily.

Examples include:

Simple bar charts – The majority of data presented in this report are presented as bar charts (horizontal and vertical in orientation). These are used as they simple to understand, clear to be explained and referenced in terms of absolute numbers or as proportions / percentages for the number of stacked bar charts used. As noted earlier, where the total population is not known from which you are sampling it is easier to present the data in terms of a stacked bar where the proportion for each group (e.g. sex, sub-sector) can be clearly seen.

Positive / Negative bar charts – Where only two options are provided to a question there is often a positive and a negative outcome. In terms of these graphics, we have presented them with a simple traffic light system, green for the positive response, and red for the negative response. NB: We have usually included an additional "grey" option for the number of null responses or where no answer was given. These make very clear presentations of results.

Area plots – Area plots are a simple way of highlighting numbers of responses by category when compared to the whole. These are for example useful in presenting the number of respondents belonging to a particular non-parametric grouping e.g. as used in Figure 8 where the ISCO classification of the sector is broken down to show the largest occupation groups by number. This is followed in the report by individual figures for the three largest categories of occupations, but can easily be converted into a single infographic as shown in Figure 23.

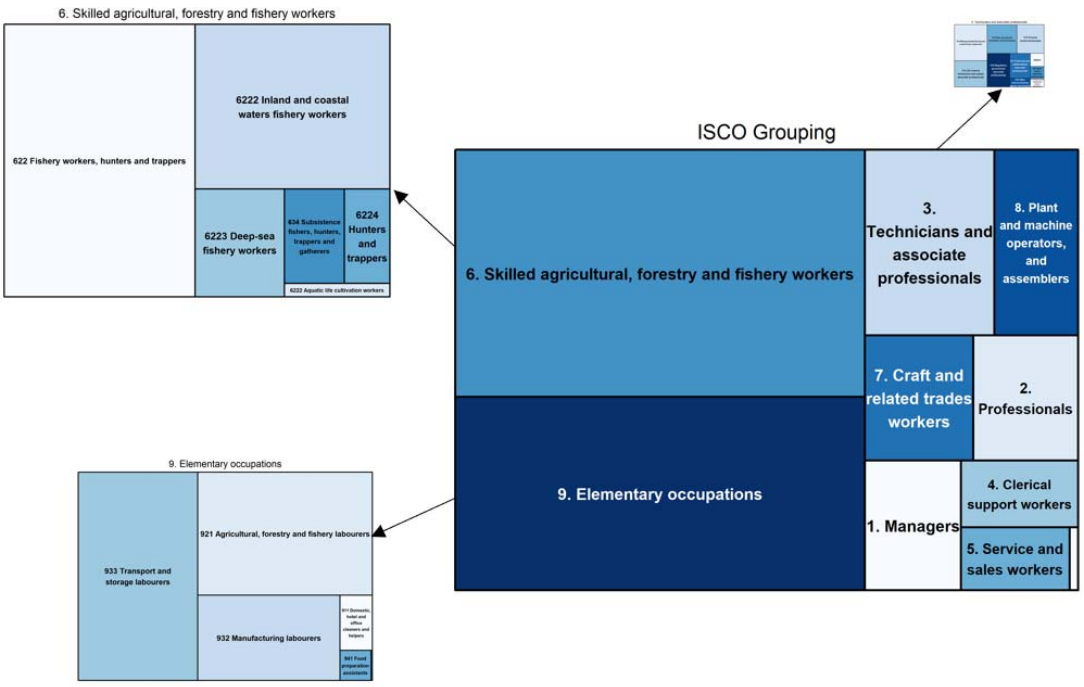

Figure 23. Example breakdown infographic based on area plots.

Word Clouds – This style of infographic is very useful in presenting text based responses from stakeholders in a semi-quantitative fashion. Word clouds present the frequency of words in a response or group of responses. These are particularly useful for presenting group discussions and highlighting the main topics of conversations in workshops or here in the responses to semi-structured questions. Where possible non-descriptive words e.g. and, for, it and in, will be excluded from the analysis as they will often be quite frequent. Word clouds can be adjusted to refer to a set number of the most frequent words, adjusted in terms of the fonts used, shape presented and other stylistics parameters.

Word clouds have been prepared for a number of the COVID-19 and semi-structured responses for the stakeholder workshop, see Figure 24 as an example Word Cloud formed from the responses to the Fisheries Emergency Plan questions in the COVID-19 survey.

Figure 24. Example Word Cloud representing the stakeholder responses to the Fisheries Emergency Plan.

Simple maps / charts with pie charts based on location – Some of the simplest infographics are those that show a map. We have limited geocoded data from this survey, basically only the location of companies is recorded, but even with this data combined with the Seychelles Administrative Boundary layer we were able to produce the key graphics in Figure 18 showing where companies and numbers of employees were based.

Other explanatory infographics – Using icon style graphics we have also developed a small number of infographics or the stakeholder implementation of a highly graphical nature to emphasise certain points where an area plot of pie chart would normally be used. It is critical though to clearly understand what is being presented as the data in Figure 25shown on a log scale do not represent the true scale of the artisanal fishery as shown in Figure 26.

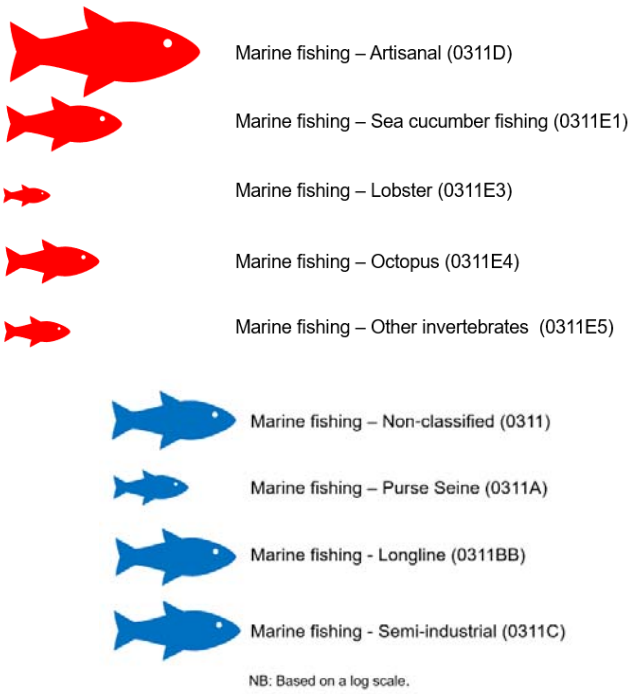

Figure 25. Infographic showing the relative importance in terms of number of employees in the artisanal (red) and industrial (blue) sectors based on a log scale.

Figure 26. Infographic showing the relative importance in terms of number of employees in the artisanal (red) and industrial (blue) sectors based on a linear scale.

5.3 Project Stakeholder Validation (Task 17)

Due to a local resurgence of the COVID-19 in Seychelles, two half-day stakeholder validation workshops were held remotely over consecutive days between 26th and 27th January 2022. Stakeholders from different sub-sectors were invited to each meeting to review and comment

on the findings and recommendations of the project. A list of participants is provided in Annex 8.

Following a presentation of the main findings of the report, all stakeholders were invited to validate the results and discuss the future employment needs in Seychelles fisheries sub-sector. A number of issues were raised for discussion including:

Education and training:

In comparison to other regional countries, the Seychelles has a well-developed education system producing a highly educated workforce. The success of this national education however, has brought with it a number of challenges to the fisheries sector. These primarily relate to recruitment into the industry (see below), which over the long term could lead to (i) a shortage of raw product entering the supply chain, thus affecting many local industries up stream and (ii) prevent future opportunities reach higher-wage senior management positions within the sector.

To date, many of the skilled labour opportunities, such as those within the processing industry, conduct in-house training of staff, bespoke to their individual business needs. Whilst this can be a costly exercise, there are a number of benefits to this approach that builds local capacity and prevents the need for foreign labour.

Foreign labour:

It was agreed there are certain types of employment within the fisheries sector that require foreign labour. These relate to opportunities that require flexibility in their working arrangements (e.g. shift work) and are less desirable to the local workforce, or high level senior management (e.g. CEO), which commands a broad range of experience and business acumen.

Some of the other benefits highlighted of using foreign labour include the flexibility to quickly adjust the workforce to the needs of the business. This can be short-term until various skill shortages can be addressed locally, or extend over the longer term where there is shown to be a need.

In addition, there exist a number of indirect benefits of foreign labour to the Seychelles. These include various downstream goods and services, such as accommodation and local retailers.

Demography of artisanal fishery:

While there exists a cohort of young Seychellois fishers, the demography of the artisanal fisheries sector shows signs of an ageing workforce. This has previously been highlighted, but raises concerns over the productivity of the artisanal fisheries sector to provide a source of protein and local employment.

To date, foreign labour cannot be used within the artisanal fisheries sector, which is allocated to Seychellois fishers only. Concerns were raised however, that the decline in youth employment, coupled with an unstable and sometimes unreliable workforce, places untoward pressure on vessel owners uncertainty within upstream supply chains. It was suggested the introduction of short-term foreign labour might need to be considered within the artisanal sector to help address these concerns.

Youth recruitment:

As previously highlighted, recruitment into the fisheries sector remains an important issue within the Seychelles. A range of challenges and solutions were presented for discussion, which raised the following points:

Although young Seychellois care about their environment, they are less willing to work in environmental type jobs, including fisheries. This may be due to a wide range of issues (see section 3.10 above).

Fish and fisheries should become more central to education and learning within the national curriculum to highlight the importance of this sector within the Seychelles, and the various job opportunities available. This should be further extended to provide vocational training or work experience in younger ages groups.

Whilst the fisheries sector retains a range of specialist skills, the private sector currently helps to up-skill new recruits, where appropriate to meet their business needs. It would be challenging for Seychelles to develop a training programme to meet all specialist needs, but should be kept under regular review.

It was noted the Maritime College encourages recruitment of trained individuals into the fisheries sector, although only a small proportion eventually enter the sector. The reasons behind this high drop-out rate should be further explored.

Finally, concerns were raised over vessel design, including safety at sea and consideration of additional comfort features.

Annex 1: Data Tables and Figures

Table 16. Full-time (FT) and part-time (PT) workers by total number and by full time equivalent (FTE) hours for each fishery sub-sector and for the sector overall.

Group	FT Workers	PT Workers	Total Workers	FT FTE	PT FTE	Total FTE	Mean FTE per worker
Fisher	1053	327	1380	1053	121.14	1174.14	0.851
Non-Fisher	2280	302	2582	2280	111.18	2391.18	0.926
Sector Total	3333	629	3962	3333	232.32	3565.32	0.900

NB: 1320 NULL returns for FT/PT

Table 17. Proportion of full-time (FT) and part-time (PT) workers by fishery sub-sector and by ISIC code.

Group	ISIC Code	FT Workers	PT Workers	FT FTE	PT FTE	Total FTE	Mean FTE
Fisher	0311	54	56	54.00	10.61	64.61	0.5875
	0311B	101	5	101.00	1.75	102.75	0.9693
	0311C	21	4	21.00	2.30	23.30	0.9320
	0311D	806	241	806.00	99.20	905.20	0.8646
	0311E1	32	7	32.00	1.94	33.94	0.8703
	0311E4	16	11	16.00	3.84	19.84	0.7348
	0321	2	3	2.00	1.50	3.50	0.7000
Non-Fisher	1020	1678	22	1678.00	11.00	1689.00	0.9935
	3011	7	2	7.00	1.00	8.00	0.8889
	4721	4	28	4.00	14.00	18.00	0.5625
	5011	95	27	95.00	13.70	108.70	0.8909
	5012	16	9	16.00	4.60	20.60	0.8240
	5222	69	159	69.00	46.99	115.99	0.5087
	5610	16	1	16.00	0.50	16.50	0.9706
	7490	252	23	252.00	2.30	254.30	0.9247
	8411	21	20	21.00	9.01	30.01	0.7320

Key ISIC Codes

Group	ISIC Code	ISIC Group Description
Fishing	0311	Marine fishing
	0311B	Marine fishing - Longline
	0311C	Marine fishing - Semi-industrial
	0311D	Marine fishing - Artisanal
	0311E1	Marine fishing - Sea Cucumbers - Invertebrates
	0311E4	Marine fishing - Octopus - Invertebrates
	0321	Marine aquaculture
Non-fishing	1020	Processing and preserving of fish, crustaceans and molluscs
	3011	Building of ships and floating structures
	4721	Retail sale of food in specialized stores
	5011	Sea and coastal passenger water transport
	5012	Sea and coastal freight water transport
	5222	Service activities incidental to land transportation
	5610	Restaurants and mobile food service activities
	8411	General public administration activities

NB: These represent the main industrial classification groups indicated in the analysis and are not an exhaustive list of all groups identified during the project,

Table 18. Distribution of wages (SCR per month) for workers in each fishery sector overall by fishing and non-fishing segments.

Wage Band (SCR)	Fisher	Non-Fisher	Sector Total
< 5,805 per month	317	555	872
5,805 - 8,555 per month	511	213	724
8,556 - 10,000 per month	392	134	526
10,001 - 15,000 per month	273	414	687
15,001 - 35,666 per month	126	312	438
35,667 - 83,000 per month	13	53	66
> 83,000 per month	0	11	11

NB: 156 fishers and 1802 non-fisher without wage band data.

Table 19. Distribution of wages (SCR per month) for workers in each fishery sector overall by ISIC sub-sector.

Group	ISICCODE	< 5,805 per month	5,805 - 8,555 per month	8,556 - 10,000 per month	10,001 - 15,000 per month	15,001 - 35,666 per month	35,667 - 83,000 per month	> 83,000 per month	Missing / NULL
Fisher	0311	53	20	14	17	14	2		
	0311A	2	9		1				5
	0311B		3	2	61	25	3		12
	0311C	1	20	14	33	18	1		45
	0311D	250	442	334	131	42	1		78
	0311E1		6	6	22	24	6		14
	0311E3			4		2			
	0311E4	6	8	13	4	1			2
	0311E5	2	3	4	3				
	0321	3		1	1				
Non-Fisher	1020	7	25	37	27	12	9	1	1621
	1040		1		4	3		1	
	3011	1	1	2					5
	3012			2	1	27			1
	3312		8	1	2				6
	3315		1	5	2	2			
	3320			1					
	4721		5	4	7	14			2
	4763		2		2	1			3
	5011	2	28	20	34	7	1	5	25
	5012		15	8	2				
	5222	528	77	46	130	151	5		135
	5224		3	2	19	19	2	3	1
	5610	2	7	4	4				
	6419				2	3			
	7490	1	33	2	171	39	28	1	1
	8411		1		7	25	8		
	9329								1
	9411	14	6						
	9900					9			1

Table 20. Distribution of wages (SCR per month) for workers in each fishery sector overall by nationality (Seychelles vs Others combined).

Group	Nationality	< 5,805 per month	5,805 - 8,555 per month	8,556 - 10,000 per month	10,001 - 15,000 per month	15,001 - 35,666 per month	35,667 - 83,000 per month	> 83,000 per month	Missing / NULL
Fisher	Seychelles	314	482	380	197	99	12	0	128
Non-fisher	Seychelles	3	29	12	76	27	1	0	28
Fisher	Oher	27	133	78	287	194	48	9	715
Non-fisher	Other	441	79	38	55	24	4	2	1087

Table 21. Proportion of full-time (FT) and part-time (PT) workers by fishery sub-sector and by nationality.

Group	Nationality	Number FT	Number PT	FTE	PTE	Total FTE	Percentage
Fisher	N/A	5	3	5	1.70	6.70	83.75%
	China	10	0	10	0	10.00	100.00%
	Indonesia	20	0	20	0	20.00	100.00%
	Italy						
	Madagascar	5	2	5	0.02	5.02	71.71%
	Malaysia						
	Other	1	0	1	0	1.00	100.00%
	Philippines	28	0	28	0	28.00	100.00%
	Seychelles	961	321	961	119.32	1080.32	84.27%
	Singapore	0	1	0	0.10	0.10	10.00%
	Sri Lanka	18	0	18	0	18.00	100.00%
	Taiwan, RoC	5	0	5	0	5.00	100.00%
Non-Fisher	N/A	8	2	8	1.25	9.25	92.50%
	Bangladesh	2	3	2	1.50	3.50	70.00%
	France	7	2	7	1.00	8.00	88.89%
	Ghana	21	0	21	0	21.00	100.00%
	India	83	0	83	0	83.00	100.00%
	Indonesia	4	2	4	0.60	4.60	76.67%
	Ivory Coast	2	0	2	0	2.00	100.00%
	Kenya	299	0	299	0	299.00	100.00%
	Madagascar	498	0	498	0	498.00	100.00%
	Malaysia	0	1	0	0.50	0.50	50.00%
	Mauritius	2	0	2	0	2.00	100.00%
	Nepal	2	0	2	0	2.00	100.00%
	New Zealand	1	0	1	0	1.00	100.00%
	Nigeria	2	0	2	0	2.00	100.00%

Group	Nationality	Number FT	Number PT	FTE	PTE	Total FTE	Percentage
	Other	6	0	6	0	6.00	100.00%
	Philippines	131	0	131	0	131.00	100.00%
	Portugal	1	0	1	0	1.00	100.00%
	Russian Federation	7	0	7	0	7.00	100.00%
	Seychelles	1152	290	1152	105.33	1257.33	87.19%
	South Africa	4	2	4	1.00	5.00	83.33%
	Spain	1	0	1	0	1.00	100.00%
	Sri Lanka	18	0	18	0	18.00	100.00%
	Thailand	22	0	22	0	22.00	100.00%
	United Kingdom	7	0	7	0	7.00	100.00%

NB: Null returns for FT /PT by nationality were Bangladesh (5), Italy (2). Madagascar (15), Malaysia (5), Nepal (4), Seychelles (379) and Sri Lanka (58). Rows for Italy and Malaysia are intentionally left blank indicating workers exist in these sub-sectors but no FT / PT indication was provided.

Table 22. Distribution of wages (SCR per month) for workers in each fishery sector overall by gender (Seychelles vs Others combined).

Group	Gender	< 5,805 per month	5,805 - 8,555 per month	8,556 - 10,000 per month	10,001 - 15,000 per month	15,001 - 35,666 per month	35,667 - 83,000 per month	> 83,000 per month	Missing / NULL
Fisher	Unknown	3	7	3					3
	Female	1	2	3	1	2			9
	Male	313	502	386	272	124	13		144
Non-Fisher	Unknown	1		1	1	8			3
	Female	4	41	15	121	64	17		978
	Male	550	172	118	292	240	36	11	821

Table 23. Distribution of wages (SCR per month) for workers in each fishery sector overall by ISIC code and gender (Seychelles vs Others combined).

Group	ISIC	Gender	< 5,805 per month	5,805 - 8,555 per month	8,556 - 10,000 per month	10,001 - 15,000 per month	15,001 - 35,666 per month	35,667 - 83,000 per month	> 83,000 per month	<>
	0311				1					
	0311	Male	53	20	13	17	14	2		
	0311A	Male	2	9		1				5
	0311B	Female								2
	0311B	Male		3	2	61	25	3		10
	0311C			1						1
	0311C	Female								5
	0311C	Male	1	19	14	33	18	1		39
	0311D		3	6	1					1
	0311D	Female	1	2	2		1			1
	0311D	Male	246	434	331	131	41	1		76
	0311E1				1					1
	0311E1	Female				1	1			1
	0311E1	Male		6	5	21	23	6		12
	0311E3	Male			4		2			
	0311E4	Male	6	8	13	4	1			2
	0311E5	Female			1					
	0311E5	Male	2	3	3	3				
Fisher	0321	Male	3		1	1				
	1020		1							
	1020	Female	2	10	5	8	4	2		944
	1020	Male	4	15	32	19	8	7	1	677
	1040	Male		1		4	3		1	
	3011	Male	1	1	2					5
	3012	Male			2	1	27			1
	3312	Female				1				
Non-Fisher	3312	Male		8	1	1				6
	3315	Male		1	5	2	2			
	3320	Male			1					
	4721	Female		1	2	3	9			
	4721	Male		4	2	4	5			2
	4763	Female		1			1			
	4763	Male		1		2				3
	5011				1	1				

Group	ISIC	Gender	< 5,805 per month	5,805 - 8,555 per month	8,556 - 10,000 per month	10,001 - 15,000 per month	15,001 - 35,666 per month	35,667 - 83,000 per month	> 83,000 per month	◊
	5011	Female				1	2			
	5011	Male	2	28	19	32	5	1	5	25
	5012	Female		1		1				
	5012	Male		14	8	1				
	5222									2
	5222	Female	1	2	4	2	8			33
	5222	Male	527	75	42	128	143	5		100
	5224	Female			1	3	4	1		
	5224	Male		3	1	16	15	1	3	1
	5610	Female	1	5	1	1				
	5610	Male	1	2	3	3				
	6419	Female				1	3			
	6419	Male				1				
	7490	Female		19	2	96	16	11		1
	7490	Male	1	14		75	23	17	1	
	8411	Female		1		4	17	3		
	8411	Male				3	8	5		
	9329	Male								1
	9411	Female		1						
	9411	Male	14	5						
	9900						8			1
	9900	Male					1			

Table 24. Distribution of wages (SCR per month) for FT workers in each fishery sector overall by age band.

Group	Age Band	< 5,805 per month	5,805 - 8,555 per month	8,556 - 10,000 per month	10,001 - 15,000 per month	15,001 - 35,666 per month	35,667 - 83,000 per month	> 83,000 per month		↕
Fisher	No data	3	3	1	4	1				7
	< 15 years old		1							
	15-17 years old	4	2	4						1
	18-24 years old	33	43	19	55	7				13
	25-34 years old	74	110	77	52	24	3			33
	35-44 years old	81	142	98	63	34	3			34
	45-54 years old	65	108	97	51	40	3			35
	55-64 years old	38	78	81	42	13	1			28
	65-74 years old	17	18	14	6	5	2			3
	75 years or older	2	6	1		2	1			2
Non-fisher	No data	526	76	39	127	131	3	3		3
	15-17 years old					10				7
	18-24 years old	3	22	9	38	5	1			82
	25-34 years old	9	40	37	123	51	12			450
	35-44 years old	7	36	20	54	56	15	5		588
	45-54 years old	2	24	15	37	38	15	1		476
	55-64 years old	5	13	12	34	19	7	2		193
	65-74 years old	3	2	2	1	2				3

Table 25. Distribution of wages (SCR per month) for FT workers in each fishery sector overall by ISIC code and age band.

Group	ISIC	Age	< 5,805 per month	5,805 - 8,555 per month	8,556 - 10,000 per month	10,001 - 15,000 per month	15,001 - 35,666 per month	35,667 - 83,000 per month	> 83,000 per month	<>
Fisher	0311	15-17 years old	1							
		18-24 years old	9	6	1	3	1			
		25-34 years old	19	5	4	4	3			
		35-44 years old	10	5	2	4	3	1		
		45-54 years old	7	2	4	1	6			
		55-64 years old	6	2	3	4		1		
		65-74 years old				1	1			
		75 years or older	1							
	0311A	25-34 years old		3						
		35-44 years old	1	5		1				
		45-54 years old	1	1						2
		55-64 years old								3
	0311B	18-24 years old		1	2	46	2			
		25-34 years old				7	4			2
		35-44 years old				2	3			4
		45-54 years old		2		5	12			6
		55-64 years old				1				
		65-74 years old					2	2		
		75 years or older					2	1		
	0311C			2		1	1			4
		18-24 years old	1		1					3
		25-34 years old		2	3	1	2			12
		35-44 years old		8	4	14	6	1		8
		45-54 years old		7	4	13	7			11
		55-64 years old			1	3	1			6
		65-74 years old			1	1	1			1
		75 years or older		1						
	0311D		3	1	1	3				3
		< 15 years old		1						
		15-17 years old	2	2	4					1
		18-24 years old	23	33	14	4	3			8
		25-34 years old	53	98	65	31	8			18
		35-44 years old	64	118	82	34	9			18
		45-54 years old	56	91	83	26	11	1		10
		55-64 years old	31	75	71	29	10			16
		65-74 years old	17	18	13	4	1			2
		75 years or older	1	5	1					2

Group	ISIC	Age	< 5,805 per month	5,805 - 8,555 per month	8,556 - 10,000 per month	10,001 - 15,000 per month	15,001 - 35,666 per month	35,667 - 83,000 per month	> 83,000 per month	◊
		18-24 years old				2				1
		25-34 years old			2	8	7	3		1
		35-44 years old		3	1	7	12	1		4
		45-54 years old		3		3	3	2		5
	0311E1	55-64 years old			3	2	2			3
		18-24 years old					1			
		35-44 years old			3		1			
	0311E3	55-64 years old			1					
		15-17 years old	1							
		18-24 years old		2	1					1
		25-34 years old	1		2					
		35-44 years old	3	3	5					
		45-54 years old		2	3	2	1			1
	0311E4	55-64 years old	1	1	2	2				
		18-24 years old		1						
		25-34 years old	1	2	1	1				
		35-44 years old	1		1	1				
	0311E5	45-54 years old			2	1				
		35-44 years old	2							
		45-54 years old	1		1					
	0321	55-64 years old				1				
		15-17 years old								7
		18-24 years old		6	7	2				63
		25-34 years old	1	5	13	11	1	2		412
		35-44 years old	4	6	7	5	3	3		543
		45-54 years old	2	7	7	2	5	2		418
		55-64 years old		1	3	6	3	2	1	177
	1020	65-74 years old				1				1
		18-24 years old		1						
		25-34 years old				3				
Non-Fisher		35-44 years old					1			
		45-54 years old				1	2			
	1040	55-64 years old							1	
		25-34 years old								3
		45-54 years old			1					2
	3011	55-64 years old	1	1	1					
		15-17 years old					10			
		25-34 years old					6			
		35-44 years old			1		11			
	3012	45-54 years old			1	1				1

Group	ISIC	Age	< 5,805 per month	5,805 - 8,555 per month	8,556 - 10,000 per month	10,001 - 15,000 per month	15,001 - 35,666 per month	35,667 - 83,000 per month	> 83,000 per month	◊
		18-24 years old		1						1
		25-34 years old		3		1				3
		35-44 years old		1	1					1
		45-54 years old		2						1
		55-64 years old				1				
		65-74 years old		1						
		18-24 years old		1						
		25-34 years old			4					
		35-44 years old			1					
		45-54 years old				1	2			
	3315	55-64 years old				1				
	3320	45-54 years old			1					
					1	2	1			
		18-24 years old				1				
		25-34 years old			1	3	1			1
		35-44 years old		1	1		6			1
		45-54 years old		1	1	1	1			
	4721	55-64 years old		3			5			
		18-24 years old								1
		25-34 years old				1				
		45-54 years old		1		1				
		55-64 years old		1						1
	4763	65-74 years old					1			1
										1
		18-24 years old	1	3	1	2				3
		25-34 years old	1	18	12	15	5			5
		35-44 years old		5	1	13			5	7
		45-54 years old		2	2	2	1	1		9
		55-64 years old			3	2	1			
	5011	65-74 years old			1					
		18-24 years old		2						
		25-34 years old		3	5	1				
		35-44 years old		8	2					
		45-54 years old				1				
	5012	55-64 years old		2	1					
			526	72	36	106	103	1		
						2	8			
		18-24 years old	1	4	1	2	1	1		14
		25-34 years old			2	7	10	1		25
	5222	35-44 years old	1	1	3	4	13	1		36

Group	ISIC	Age	< 5,805 per month	5,805 - 8,555 per month	8,556 - 10,000 per month	10,001 - 15,000 per month	15,001 - 35,666 per month	35,667 - 83,000 per month	> 83,000 per month	◊
		45-54 years old			2	3	11	1		44
		55-64 years old			2	6	5			15
		65-74 years old								1
				3	2	16	18	2	3	1
		45-54 years old				1	1			
	5224	55-64 years old				2				
		18-24 years old	1							
		25-34 years old		1						
		35-44 years old		2	1					
		45-54 years old		4		2				
		55-64 years old	1		2	2				
	5610	65-74 years old			1					
		25-34 years old				1	3			
	6419	45-54 years old				1				
				1		1	1			
		18-24 years old		4		29	2			
		25-34 years old	1	9		78	12	6		1
		35-44 years old		10	2	31	14	10		
		45-54 years old		5		19	8	9	1	
		55-64 years old		4		13	1	3		
	7490	65-74 years old					1			
		18-24 years old				2	2			
		25-34 years old				2	10	3		
		35-44 years old		1		1	6	1		
		45-54 years old				1	3	2		
	8411	55-64 years old				1	4	2		
	9329	45-54 years old								1
		25-34 years old	6	1						
		35-44 years old	2	1						
		45-54 years old		2						
		55-64 years old	3	1						
	9411	65-74 years old	3	1						
										1
		25-34 years old					3			
		35-44 years old					2			
	9900	45-54 years old					4			

Table 26. Number of Seychellois and Foreign workers by fishery sub-sector.

Group	Seychellois	Foreign	N/A	Proportion Foreign Workers
Fisher	1612	160	16	0.090
Non-Fisher	2335	1149	10	0.330
Sector Total	3947	1309	26	0.249

Table 27. Number of Seychellois and Foreign workers by fishery sub-sector and ISIC Code

Group	ISIC	Seychelles	Foreign	N/A	Proportion Foreign Workers
Fisher	0311	118	0	2	0.00
	0311A	3	14		0.82
	0311B	43	62	1	0.58
	0311C	79	51	2	0.39
	0311D	1268	3	7	0.00
	0311E1	46	29	3	0.37
	0311E3	6	0		0.00
	0311E4	34	0		0.00
	0311E5	10	1	1	0.08
	0321	5	0		0.00
Non-Fisher	1020	633	1103	3	0.63
	1040	3	6		0.67
	3011	8	1		0.11
	3012	25	6		0.19
	3312	14	3		0.18
	3315	7	2	1	0.20
	3320	1	0		0.00
	4721	26	6		0.19
	4763	8	0		0.00
	5011	112	6	4	0.05
	5012	25	0		0.00
	5222	797	2		0.00
	5224	42	7		0.14
	5610	15	1	1	0.06
	6419	5	0		0.00
	7490	270	6		0.02
	8411	41	0		0.00
	9329	1	0		0.00
	9411	20	0		0.00
	9900	9	0	1	0.00

Table 28. Summary of responses of targeted fisher questions.

Question		Yes	No	N/A
Are you a registered fisher?	Number	480	75	2
	Percentage	86.18%	13.46%	0.36%
Do you contribute to a pension?	Number	351	202	4
	Percentage	63.02%	36.27%	0.72%
Do you make contributions to an insurance scheme?	Number	456	94	7
	Percentage	81.87%	16.88%	1.26%
Do you get benefits during periods of sick leave?	Number	339	207	11
	Percentage	60.86%	37.16%	1.97%

Table 29. Pension contribution in relation to fisher registration.

Registered Fisher		Do you contribute to a pension?	
		Yes	No
Yes	Number	323	28
	Percentage	92.02%	7.97%
No	Number	155	47
	Percentage	76.73	23.267

Table 30. Insurance scheme contribution in relation to fisher registration.

Registered Fisher		Do you contribute to an insurance scheme?	
		Yes	No
Yes	Number	413	43
	Percentage	90.57%	9.43%
No	Number	64	30
	Percentage	68.09%	31.91%

Table 31. Sickness benefit contribution in relation to fisher registration.

Registered Fisher		Do you get sickness benefits?	
		Yes	No
Yes	Number	331	8
	Percentage	97.64%	2.36%
No	Number	140	67
	Percentage	67.63%	32.37%

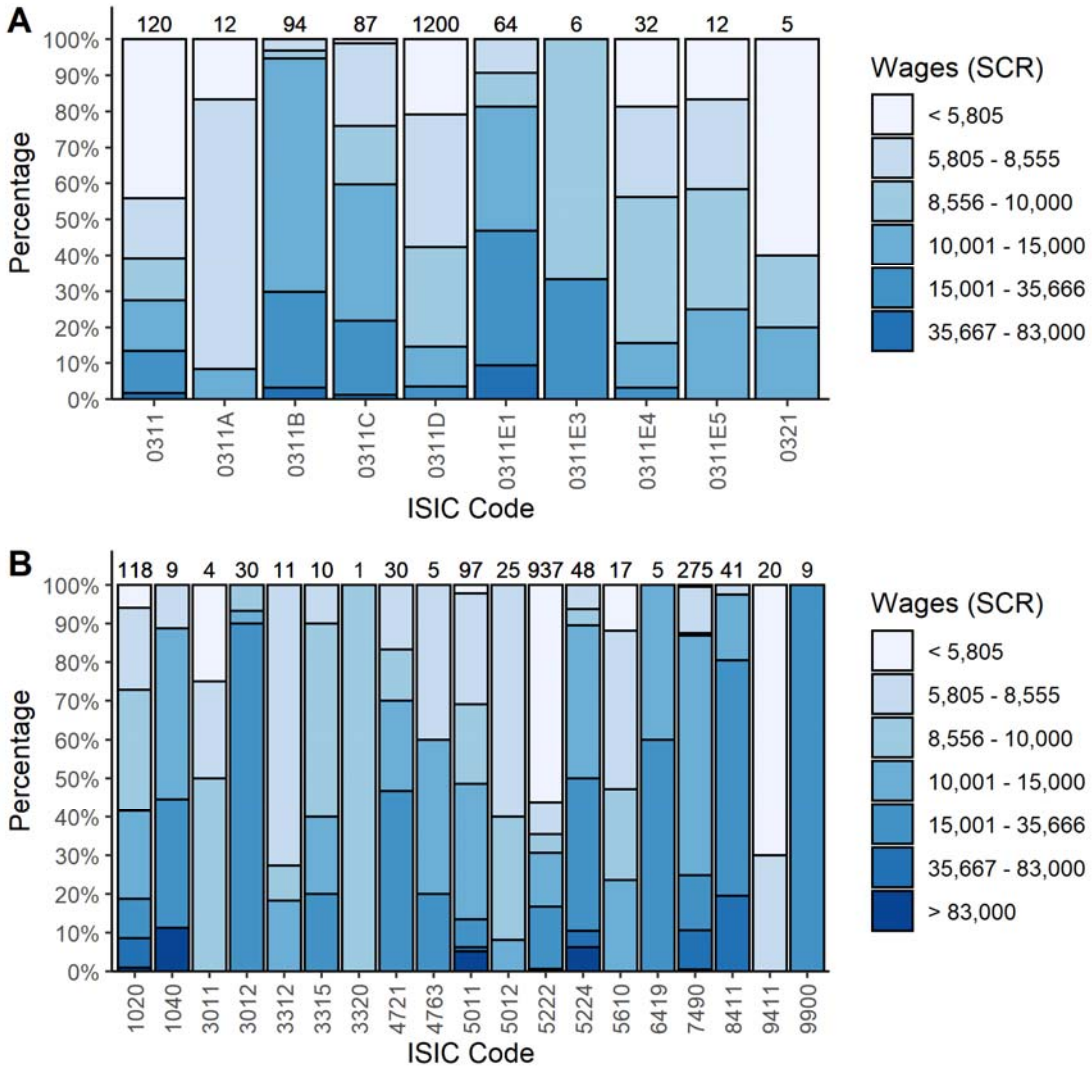

Figure 27. Distribution of wages (SCR per month) for workers in each ISIC Code.

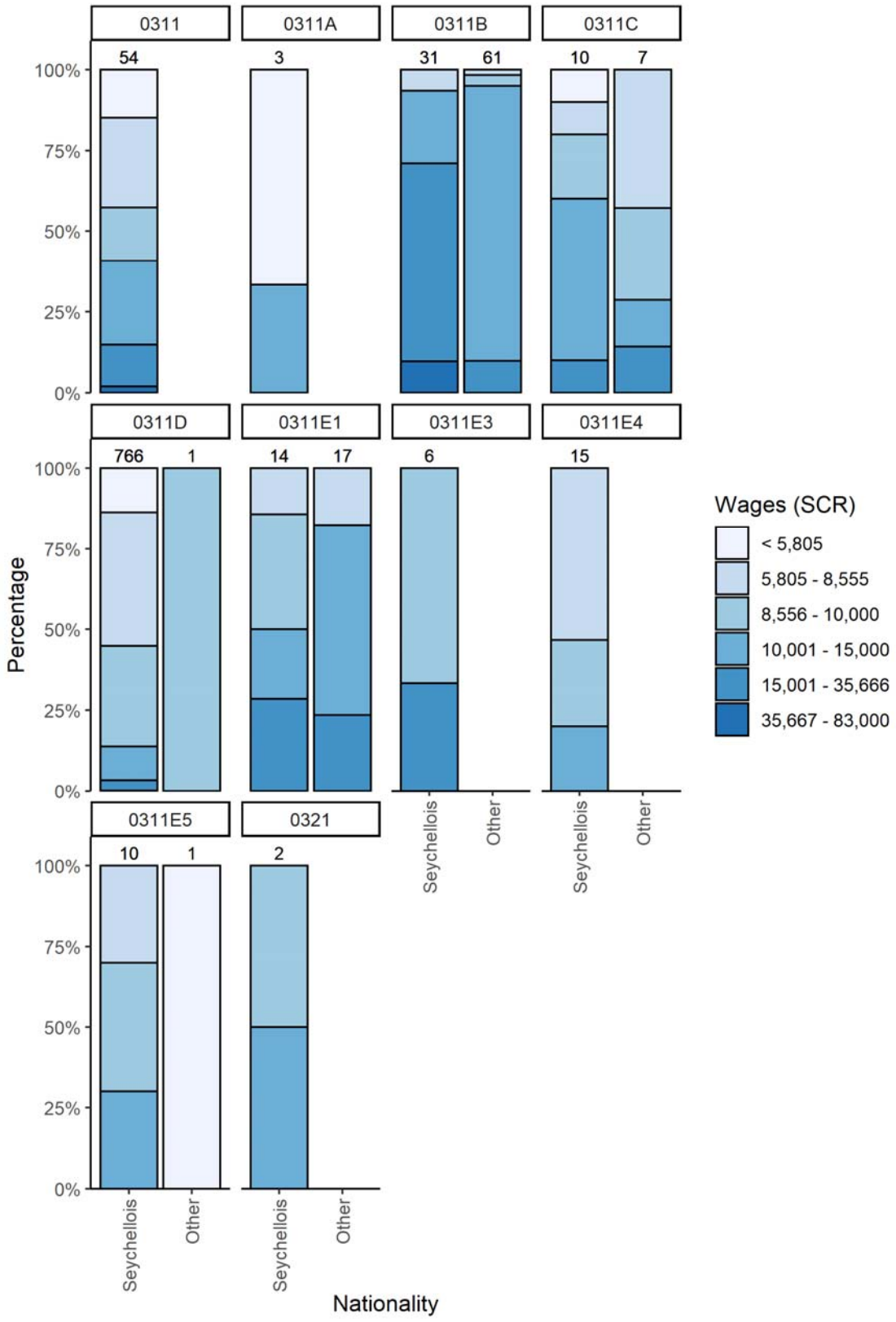

Figure 28. Distribution of full-time (FT) employee wages (SCR/month) for each fisher sub-sector by nationality.

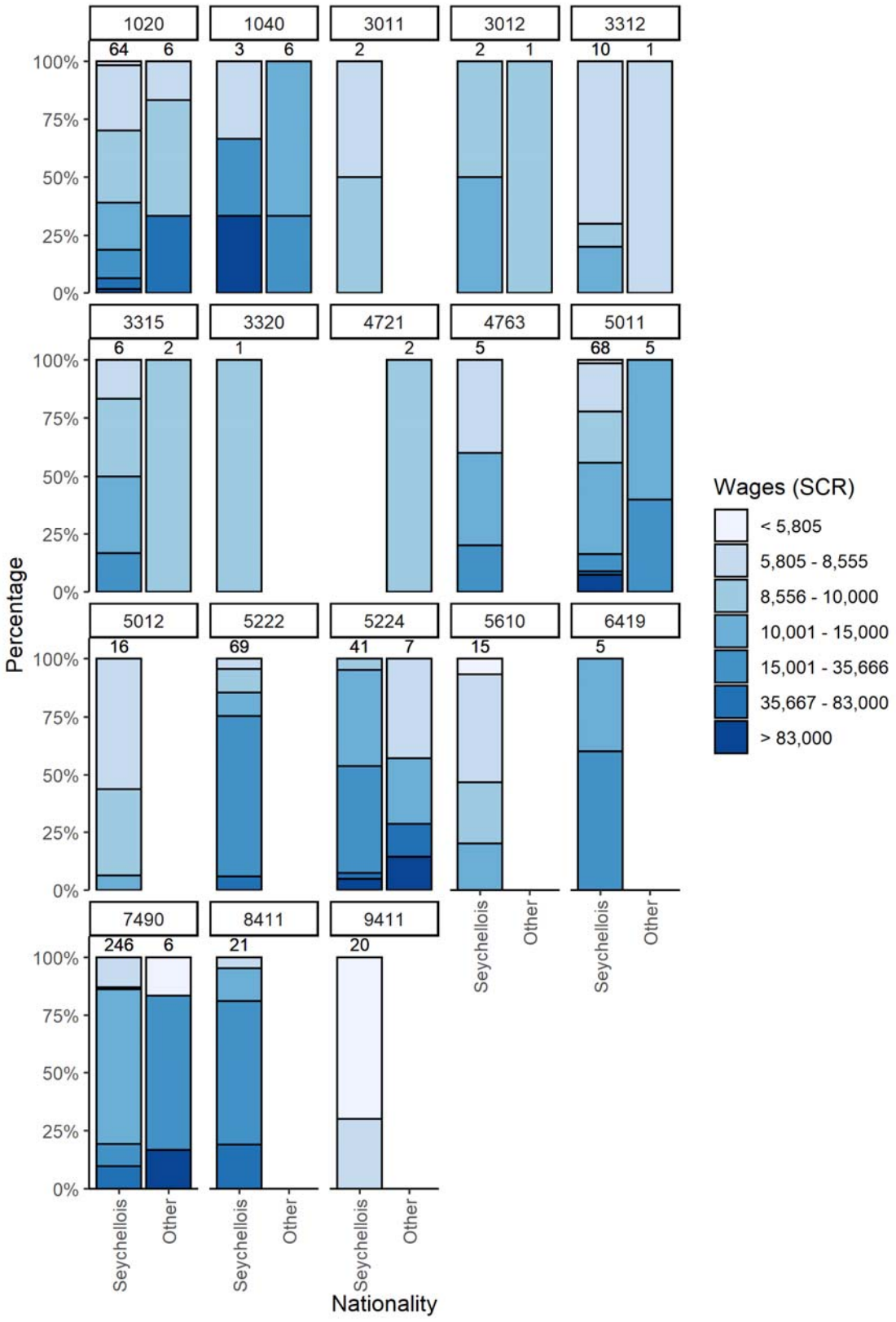

Figure 29. Distribution of full-time (FT) employee wages (SCR/month) for each non-fisher sub-sector by nationality

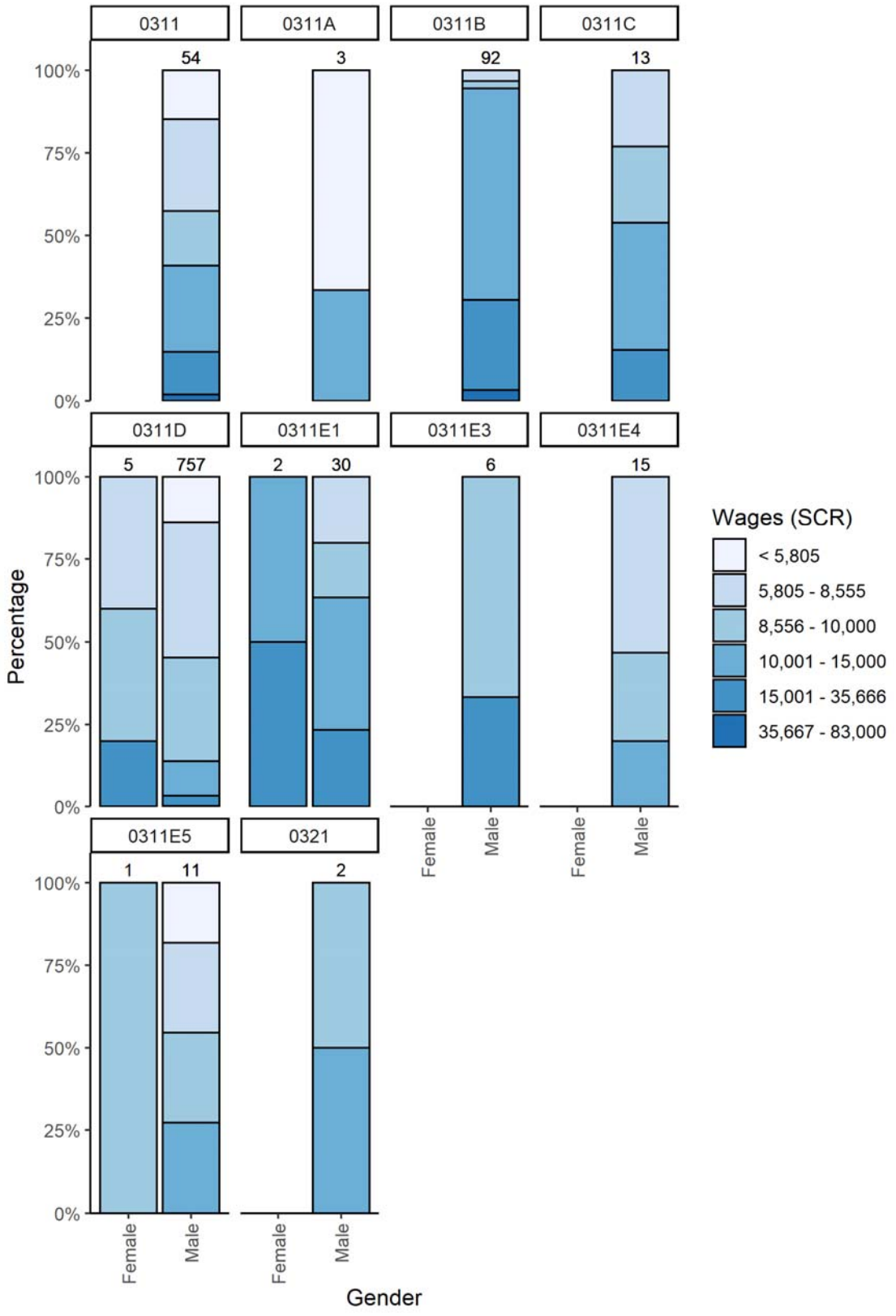

Figure 30. Distribution of full-time (FT) employee wages (SCR/month) for each fisher sub-sector by gender.

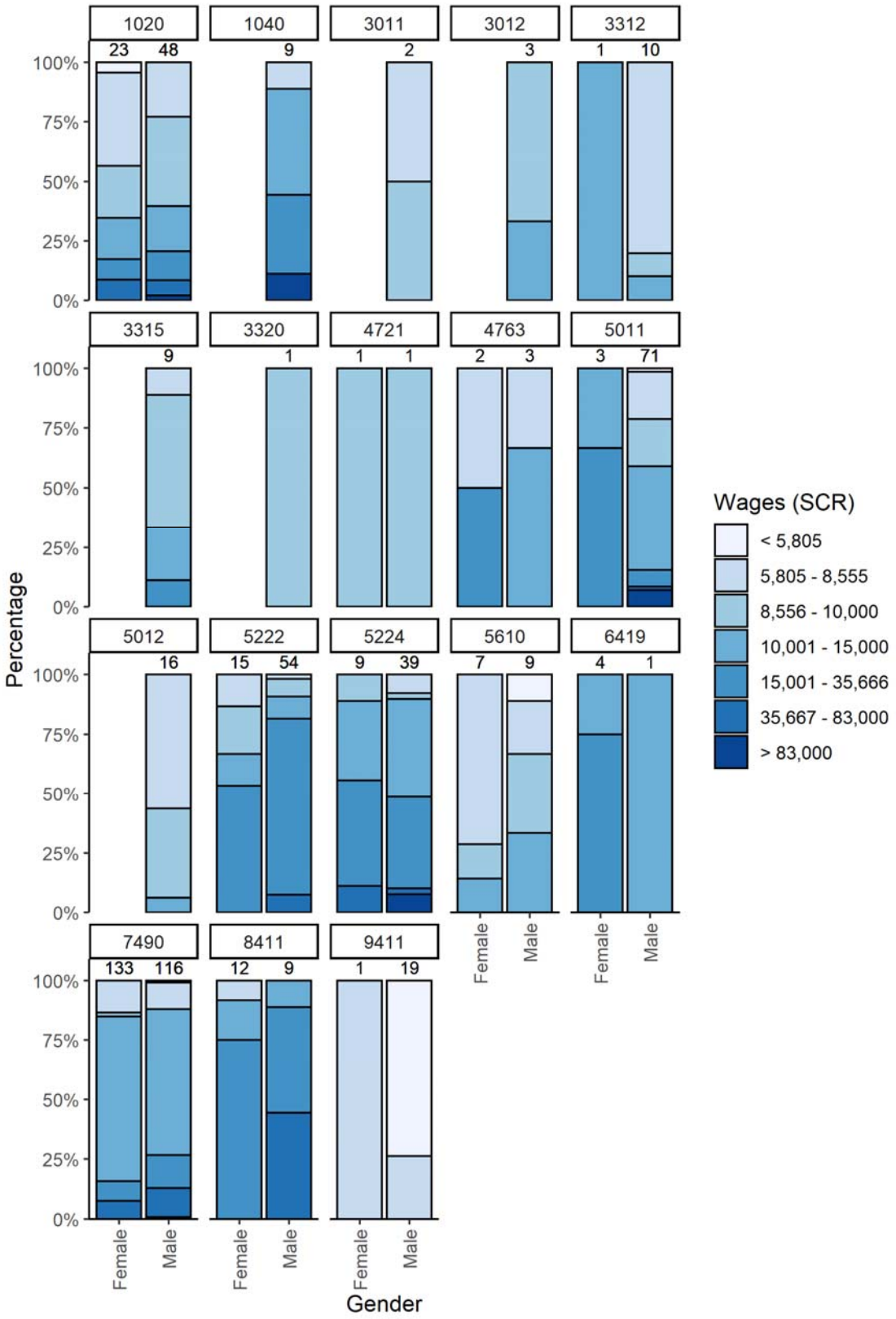

Figure 31. Distribution of full-time (FT) employee wages (SCR/month) for each non-fisher sub-sector by gender.

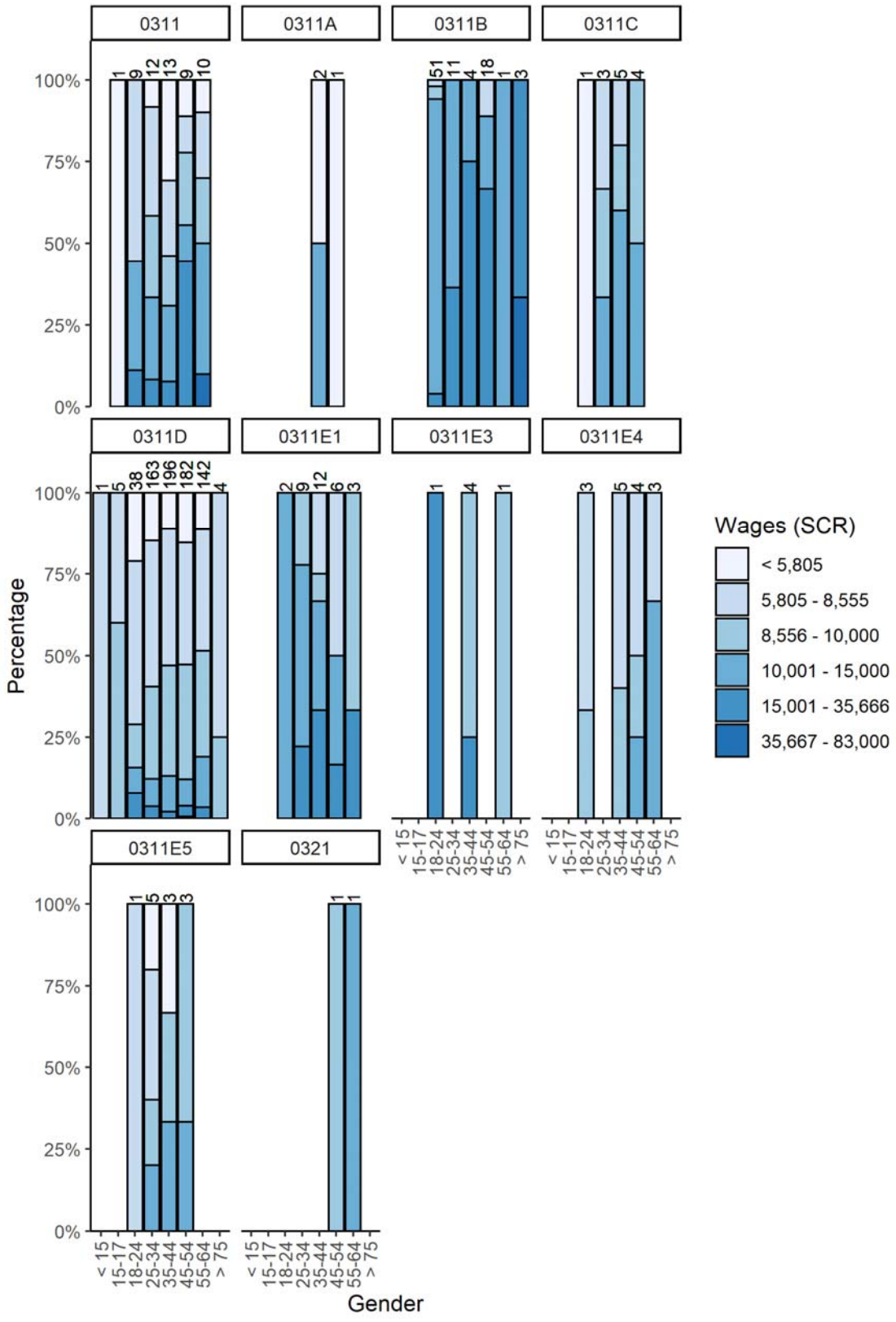

Figure 32. Distribution of full-time (FT) employee wages (SCR/month) for each fisher sub-sector by age.

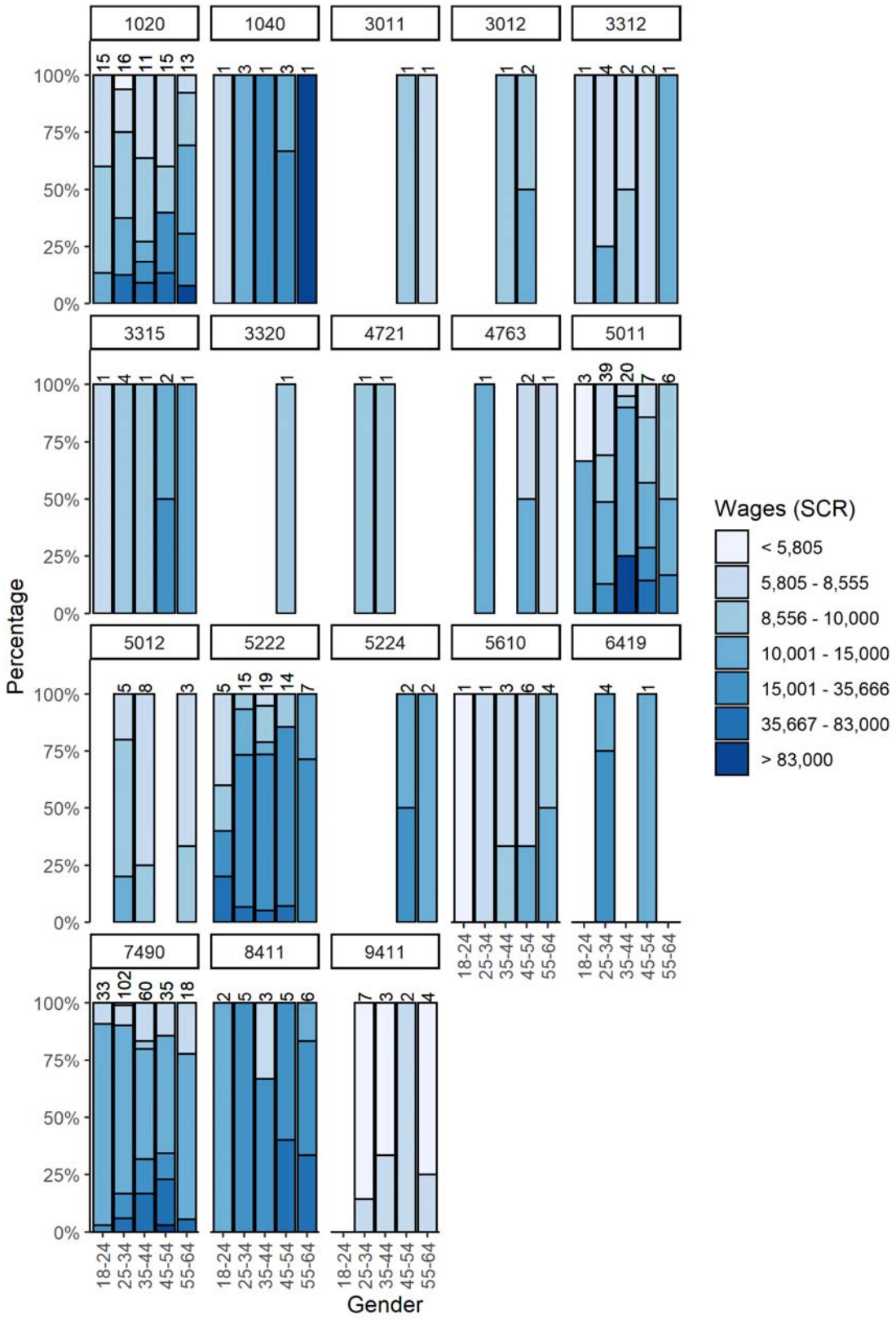

Figure 33. Distribution of full-time (FT) employee wages (SCR/month) for each non-fisher sub-sector by age.

Figure 34. Breakdown of ISCO class 6 "Skilled agricultural, forestry and fishery workers".

Figure 35. Breakdown of ISCO class 9 "Elementary occupations".

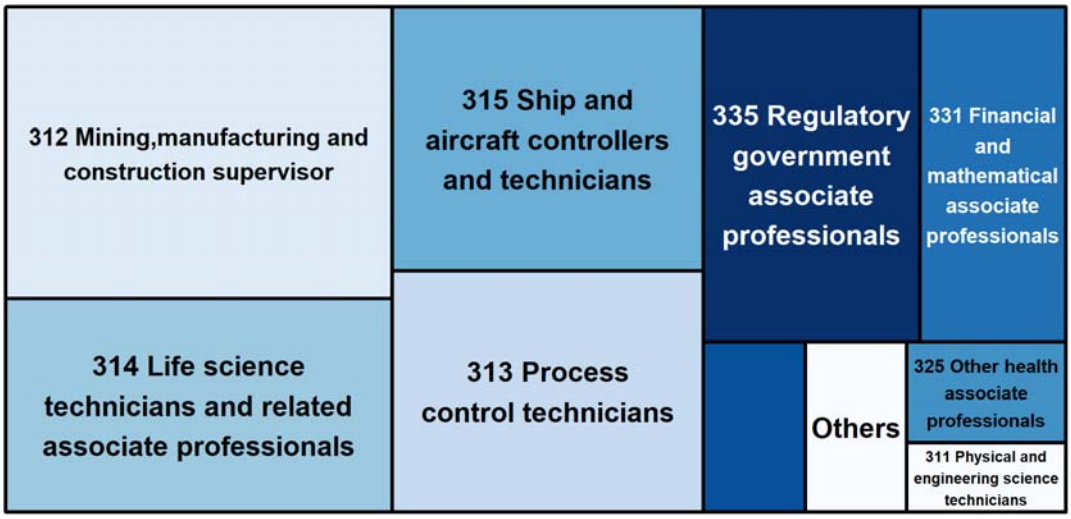

Figure 36. Breakdown of ISCO class 3 "Technician and associate professionals".

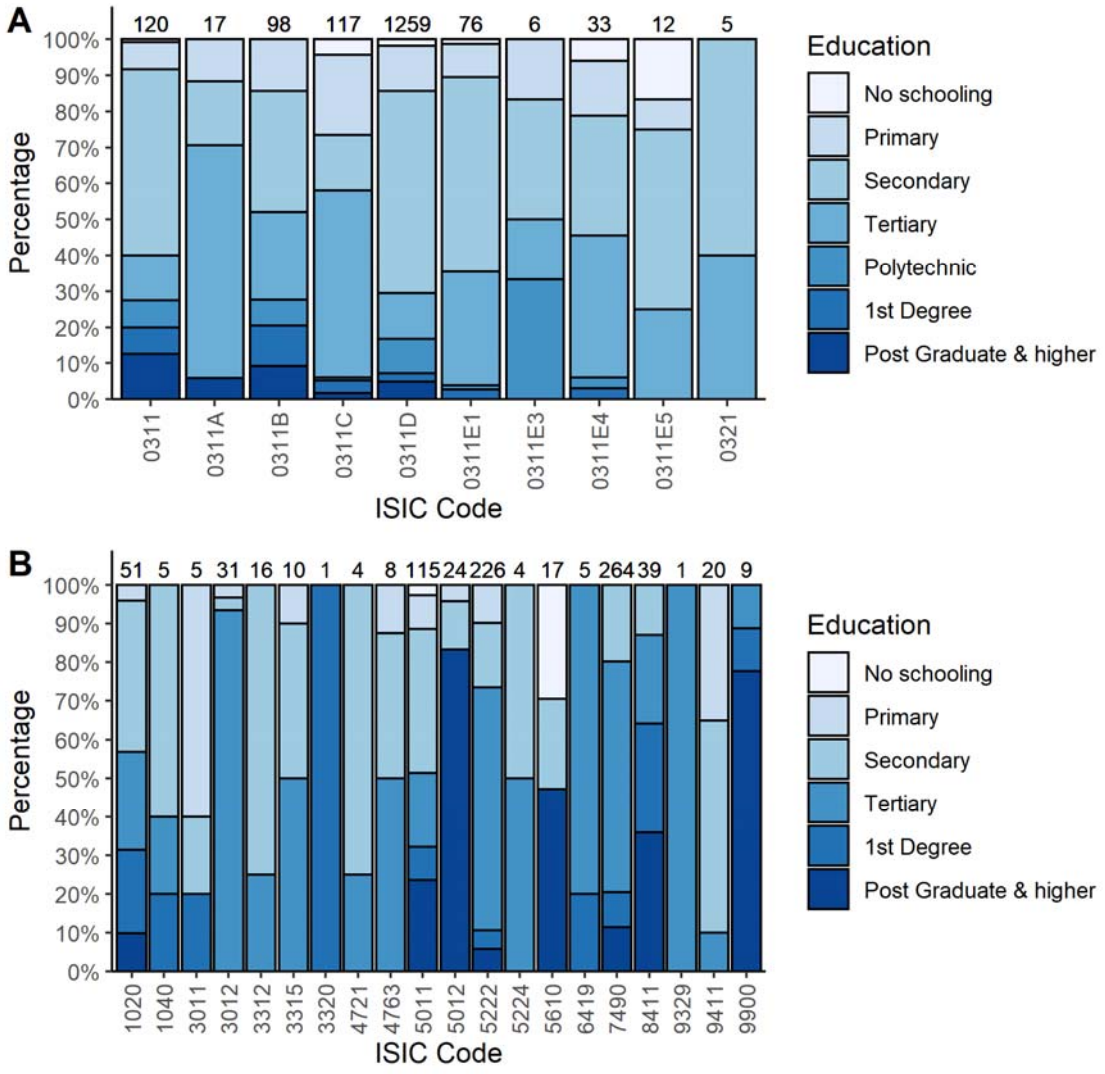

Figure 37. Education level bands reported by ISIC industry classification code for Fisher and Non-Fisher sub-sectors.

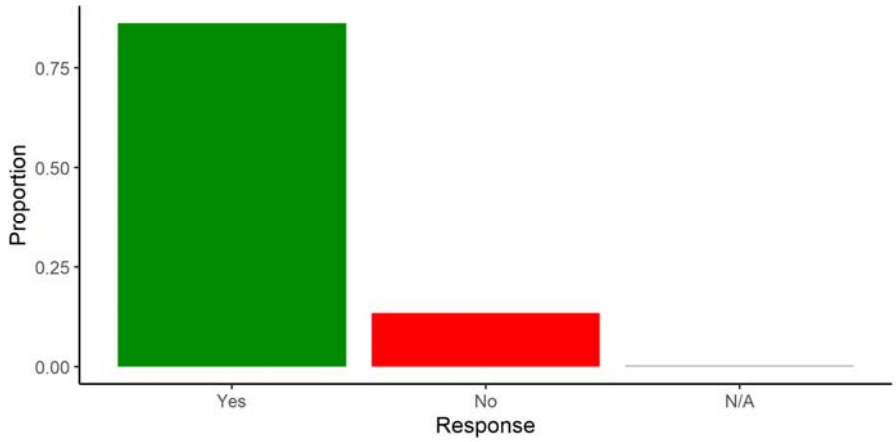

Figure 38. Are you a registered fisher?

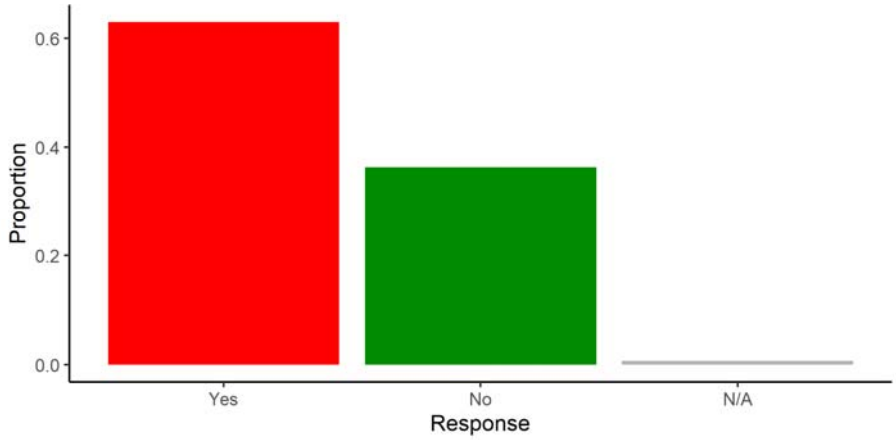

Figure 39. Pension contributions made by total artisanal fishers.

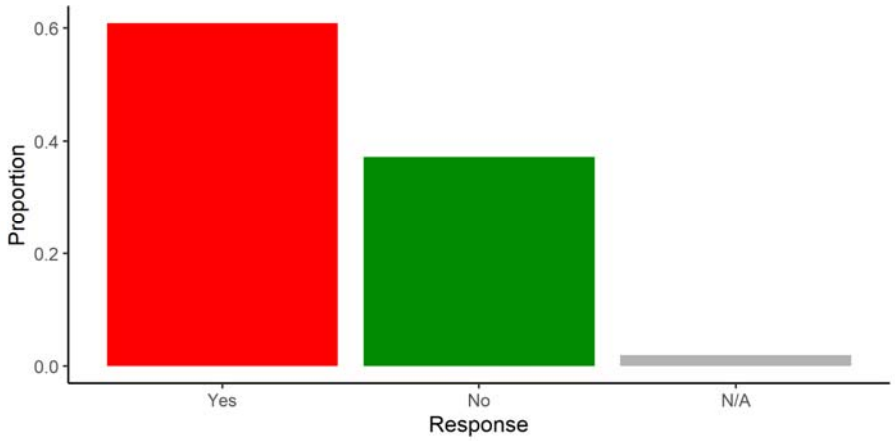

Figure 40. Are you insured? (Total artisanal fishers).

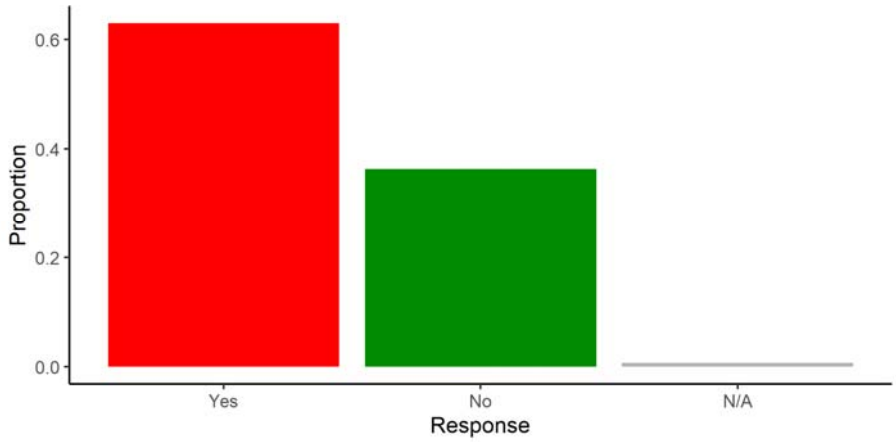

Figure 41. Do you get sickness benefits during periods when you cannot work?

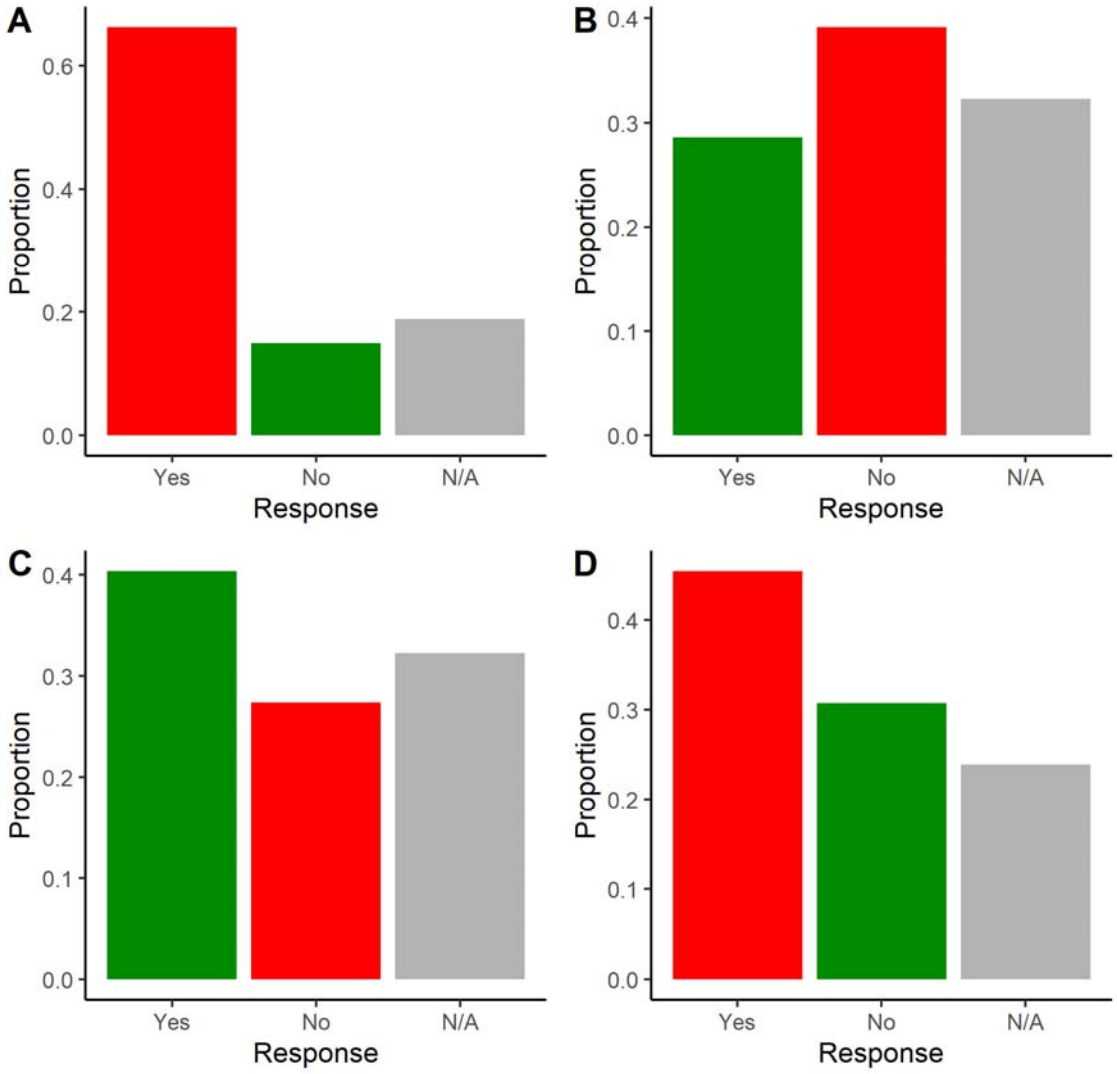

Figure 42. Participant responses to COVID-19 questions. A) Has COVID-19 impacted your business? B) Have the adaptive measures produced by the Ministry of Employment such as the new GOP framework and other employment programs (URS, MFJ & SDP) mitigated some of the negative effects of COVID-19 on the workforce? C) Has the Fisheries Emergency Plan produced by the Fisheries Department reduced the negative impacts caused by COVID-19? D) Has COVID-19 impacted productivity of the workforce?

Annex 2: Stakeholder questionnaire – Company version

Employment Study and Capacity Needs Assessment for the Fisheries Sector in Seychelles

Questionnaire – Fishing Sector Companies

Company Name	PRE-FILLED	
Completed By:	Name:	____ / ____ / _____
	Email:	
Location	Mahé	
	Praslin	
	La Digue	
	Farquhar	
	Other nei	
Industry Code:	Pre-FILLED	
Total Employees:		
Male:		**Female:**
Seychellois		**Foreign:**
Years in Sector:		
Annual Turnover:		SCR

Comments:

One row to be completed for each employee (or complete attached spreadsheet)

Occupation Code	Employment Status	Gender (M/F/U)	Age (or Age Band)	Nationality	Education Level	FT / PT Percentage	Number Years In Employment	Wage Band

NB Pull down menus / lookups will be developed in spreadsheet form for larger companies / organisations. Smaller ones can be manually completed and entered by staff. (Originals scanned as PDF for reference).

Notes for Completion:

Company Name	The registered name of the company / organisation being interviewed. This will be provided pre-filled by the project team.
Completed by	If completed by the company / organisation, the person who has completed the questionnaire on behalf of the company / organisation should enter their name and email in the appropriate boxes or this should be completed by the interviewer. If by interview, listed the company contact in the "Comments" field.
Completed Date	The date of the interview.
Location	Where the company / organisation is based.
Industry Code	The relevant ISIC code, which will be pre-filled by the project team
Total Employees	The total number of employees in the company / organisation.
Male	The number of male employees in the company / organisation.
Female	The number of female employees in the company / organisation**.**
Seychellois	The number of Seychellois employees in the company / organisation.
Foreign	The number of foreign employees in the company / organisation.
Years in Sector	The number of years the company / organisation has been involved in the Seychelles fisheries sector.
Annual Turnover	The approximate annual turnover of the company (in SCR).
Comments	Any comments (e.g. interviewed people, other relevant information).

Code tables:

Occupation Codes – ISCO code for the roles within the company.

Lookup tables to be sorted by sub-sector and provided for each sub-sector.

Employment Status Codes - ICSE93 employment status classification codes

11	**Employers in corporations**
12	Employers in household market enterprises
21	**Owner-operators of corporations without employees**
22	Own-account workers in household market enterprises without employees
30	Dependent contractors
41	**Permanent employees**
42	**Fixed-term employees**
43	Short-term and casual employees
44	Paid apprentices, trainees and interns
51	Contributing family workers
99	Not elsewhere included

Age Band Codes – Standard age band codes for employees

1	Under 12 years old
2	12-17 years old
3	18-24 years old
4	25-34 years old
5	35-44 years old
6	45-54 years old
7	55-64 years old
8	65-74 years old
9	75 years or older

Nationality Codes – ISO 3166 three latter codes for nationality

CHN	China
ESP	Spain
FRA	France
GBR	United Kingdom
IDN	Indonesia
IND	India
ITA	Italy
LKA	Sri Lanka
MUS	Mauritius
MYS	Malaysia
NZL	New Zealand
PHL	Philippines
SYC	**Seychelles (Default)**
TWN	Taiwan, Republic of China

NB: Full list to be provided. Likely subset to be added as top ten from other sources.

Education Level Codes – International Standard Classification of Education (ISCED) education level standard codes

0	No schooling
1	Primary
2	Secondary
3	Advanced level
4	Vocational
5	Polytechnic
6	1st Degree
7	Post Graduate & higher

Wage Band Codes –During testing phase the following codes were used:.

1	< 2,500 (SCR per month)
2	2,500 <= 4,000 (SCR per month)
3	4000 <= 10,000 (SCR per month)
4	10,000 <= 15,000 (SCR per month)
5	15,000 <= 20,000 (SCR per month)
6	20,000 <= 25,000 (SCR per month)
7	25,000 <= 30,000 (SCR per month)
8	30,000 +

NB: These were reviewed after the initial phase and redrafted to use the standards used in the Seychelles as follows:

1	< 5,805 per month
2	5,805 - 8,555 per month
3	8,556 - 10,000 per month
4	10,001 - 15,000 per month
5	15,001 - 35,666 per month
6	35,667 - 83,000 per month
7	> 83,000 per month

Annex 3: Stakeholder questionnaire – Fisher version

Name		
Contact Details:	Tel:	Email:
Completed By:		____ / ____ / _____

Gender:	Male	Female	Unknown

Age:	1 - < 15 years old	
	2 - 15-17 years old	
	3 - 18-24 years old	
	4 - 25-34 years old	
	5 - 35-44 years old	
	6 - 45-54 years old	
	7 - 55-64 years old	
	8 - 65-74 years old	
	9 - 75 years or older	
Nationality	Enter three letter code: (e.g. SYC for Seychelles)	
Education Level	0 - No schooling	
	1 - Primary	
	2 - Secondary	
	3 - Tertiary	
	4 - 1st Degree	
	5 - Post Graduate & higher	

Industry Code:	**Sector:**	**Percentage**
	0311A - Industrial Purse Seine	
	0311B - Industrial longline	
	0311C - Semi-industrial longline	
	0311D - Artisanal - Local vessels	
	0311E1 - Sea Cucumber - Invertebrates - Marine fishing	
	0311E2 - Crabs - Invertebrates - Marine fishing	
	0311E3 - Lobster - Invertebrates - Marine fishing	
	0311E4 - Octopus - Invertebrates - Marine fishing	
	0311E5 - Others - Invertebrates - Marine fishing	
	Other fishery sector work	
	Non-Fishery work	
	Non-working time	
	Please provide any other details:	
	(Please enter the percentage time worked in each sub-sector. Percentages must add up to 100%. For example, if a fisher works half the year in the sea cucumber fishery and half on non-fishery work they would entre 50% into both 0311E1 and Non-Fishery work rows, if they work only 50% of the time in the artisanal fishery they would put 50% next to 0311D and 50% in non-working time).	

Occupation Code:	**622** Fishery workers	**634** Subsistence fishers
	634A Semi-Subsistence Fishers	**634B** Recreational Fishers

(Please select one)

Location (Base of Operations)	
	Mahé
	Praslin
	La Digue
	Other nei
	(Please enter specific location code)

Employment Status	
	11 - Employers in corporations
	12 - Employers in household market enterprises
	21 - Owner-operators of corporations without employees
	22 - Own-account workers in household market enterprises without employees
	30 - Dependent contractors
	41 - Permanent employees
	42 - Fixed-term employees
	43 - Short-term and casual employees
	44 - Paid apprentices, trainees and interns
	51 - Contributing family workers
	99 - Not elsewhere included

(Please select one)

Years employed in Sector:	

NB: Years where you have been employed in the fisheries sector as a source of income (Based as an average over the last three years).

Contribution to Pension: (Yes / No)	

Is the vessel you are working on insured : (Yes / No)	

Have you ever benefited from Sick Leave Benefit[38] ?(Yes / No)	

Are you a registered fisher? (Yes / No)	

Wage / Earnings (SCR per month from fisheries sector employment)	
	< 5,805 per month
	5,805 - 8,555 per month
	8,556 - 10,000 per month
	10,001 - 15,000 per month
	15,001 - 35,666 per month
	35,667 - 83,000 per month
	> 83,000 per month

[38] Sick leave benefit is provided by the Social Security to a fisher who is on sick leave but the fisher has to be registered with SFA.

How can the government engage youth in choosing fishing as a career?	Please provide some advice.

Comments:	Other Comments : E.g - Which vessel or company you are working with currently?

Nationality Codes – ISO 3166 three latter codes for nationality

Code	Nationality
BGD	Bangladesh
CHN	China
FRA	France
IND	India
IDN	Indonesia
ITA	Italy
JPN	Japan
KEN	Kenya
MDG	Madagascar
MYS	Malaysia
MUS	Mauritius
NPL	Nepal
NZL	New Zealand
PAK	Pakistan
PHL	Philippines
RUS	Russian Federation
SYC	**Seychelles (Default)**
ZAF	South Africa
ESP	Spain
LKA	Sri Lanka
TWN	Taiwan, Republic of China
GBR	United Kingdom

NB: Full list to be provided. Likely subset to be added as top ten from other sources.

Landing Site Codes

Island	Region		District		Landing Location	
MAHE	MHN	Mahe North	DC-BO	Belombre	LS-BO	Belombre
MAHE	MHN	Mahe North	DC-BV	Beau Vallon	LS-BV	Beau Vallon
MAHE	MHN	Mahe North	DC-GL	Glacis	LS-GLA	Glacis
MAHE	MHN	Mahe North	DC-AE	Anse Etoile	LS-PC	Pointe Conan
MAHE	MHN	Mahe North	DC-AE	Anse Etoile	LS-LRT	La Retraite
MAHE	MHN	Mahe North	DC-AE	Anse Etoile	LS-AE	Anse Etoile
MAHE	MHC	Mahe Central	DC-PE1	Perseverance	LS-PE1	Perseverence 1
MAHE	MHC	Mahe Central	DC-PE0	Perseverance	LS-PS2	Perseverence 2
MAHE	MHC	Mahe Central	DC-ER	English River	LS-ER	English River
MAHE	MHC	Mahe Central	DC-MF	Victoria	LS-VC	Victoria
MAHE	MHC	Mahe Central	DC-MA	Mont Fleuri	LS-MFL	Mont Fleuri
MAHE	MHC	Mahe Central	DC-MA	Roche Caiman	LS-RC	Roche Caiman
MAHE	MHC	Mahe Central	DC-RC	Anse Aux Pins	LS-APM	Anse Aux Pins Market
MAHE	MHC	Mahe Central	DC-VC	Anse Aux Pins	LS-APR	Anse Aux Pins Reef
MAHE	MHC	Mahe Central	DC-MA	Les Mamelles	LS-BR	Les Mamelles (Brillant)
MAHE	MHC	Mahe Central	DC-MA	Les Mamelles	LS-MA	Les Mamelles
MAHE	MHC	Mahe Central	DC-MA	Les Mamelles	LS-RO	Les Mamelles (le Rocher)
MAHE	MHE	Mahe East	DC-AP	Cascade	LS-ATB	Anse Talbot
MAHE	MHE	Mahe East	DC-AP	Cascade	LS-CA	Cascade /Se Island
MAHE	MHE	Mahe East	DC-CA	Cascade	LS-PP	Petit Paris
MAHE	MHE	Mahe East	DC-CA	Cascade	LS-PRV	Providence
MAHE	MHE	Mahe East	DC-CA	Anse Royale	LS-AF	Anse Forban
MAHE	MHE	Mahe East	DC-AR	Anse Royale	LS-ARM	Anse Royale Market
MAHE	MHS	Mahe South	DC-AR	Anse Royale	LS-ARS	Anse Royale School
MAHE	MHS	Mahe South	DC-AR	Anse Royale	LS-PSL	Pointe Au Sel
MAHE	MHS	Mahe South	DC-TK	Takamaka	LS-BGV	Bougainville
MAHE	MHS	Mahe South	DC-TK	Takamaka	LS-TAK	Takamaka
MAHE	MHW	Mahe West	DC-AB	Anse Boileau	LS-APB	Anse Aux Poules Bleues
MAHE	MHW	Mahe West	DC-AB	Anse Boileau	LS-ABL	Anse Boileau
MAHE	MHW	Mahe West	DC-AB	Anse Boileau	LS-AG	Anse Gaulette
MAHE	MHW	Mahe West	DC-AB	Anse Boileau	LS-AM	Anse La Mouche
MAHE	MHW	Mahe West	DC-PG	Port Glaud	LS-PG	Port Glaud /Port Launay
PRASLIN	PRE	Praslin East	DC-BS	Baie Ste Anne	LS-ABD	Anse Boudin
PRASLIN	PRE	Praslin East	DC-BS	Baie Ste Anne	LS-ALB	Anse La Blague
PRASLIN	PRE	Praslin East	DC-BS	Baie Ste Anne	LS-AML	Anse Maries Louise
PRASLIN	PRE	Praslin East	DC-BS	Baie Ste Anne	LS-APS	Anse Possession
PRASLIN	PRE	Praslin East	DC-BS	Baie Ste Anne	LS-BSA	Baie Ste Anne

Island	Region		District		Landing Location	
PRASLIN	PRE	Praslin East	DC-BS	Baie Ste Anne	LS-CSY	Cap Samy
PRASLIN	PRE	Praslin East	DC-BS	Baie Ste Anne	LS-CO	Cote D'or
PRASLIN	PRW	Praslin West	DC-GAP	Grand Anse (P)	LS-AIR	Airstrip/Flying Deutchman
PRASLIN	PRW	Praslin West	DC-GAP	Grand Anse (P)	LS-AK	Anse Kerlan/Roche Corbigeau
PRASLIN	PRW	Praslin West	DC-GAP	Grand Anse (P)	LS-CON	Consolation
PRASLIN	PRW	Praslin West	DC-GAP	Grand Anse (P)	LS-GAS	Flying Deutchman/ Grand Anse
PRASLIN	PRW	Praslin West	DC-GAP	Grand Anse (P)	LS-RCB	Roche Corbigeau/Airstrip
PRASLIN	PRW	Praslin West	DC-GAP	Grand Anse (P)	LS-SS	Saint Sauveur
LADIGUE	LDG	La Digue	DC-LDG	La Digue	LS-AR	Anse Reunion
LADIGUE	LDG	La Digue	DC-LDG	La Digue	LS-LP	La Passe

Annex 4: Semi-Structured Interview Questions

Primary

Overall Fisheries Sector Definition

Questions to be asked	• What is the size and composition of the current fisheries sector? (catch, landings into Seychelles, processing in Seychelles, transhipment in Seychelles, exports from Seychelles) by sub-sector. • What will be the planned size and composition of the planned fisheries sector (with plans) in 5 / 10 years' time. (as above) ⇨ Define changes to sector ⇨ Where do the changes need to be made? ⇨ What are the main employment / sectoral development issues in the overall sector? For example, lack of skills in particular areas?
Primary respondents	• Ministry of Fisheries and Agriculture • Seychelles Fishing Authority • Larger fishing / processing interests.
Secondary respondents	Main industry bodies • Fishing • Processing
Interview Structure	Skype Interview by Core Team
Link to Analysis	Sets the baseline for potential future (not current skills gaps). Need to factor in appropriate size increase / decrease to fisheries and their roles. Management / science / MCS etc percentage by fishery.

Secondary

Gender Opportunities and Issues

Questions to be asked	• Are opportunities gender equal in your company and sub-sector? • Are there policies at government level to require this? • How do you implement gender equality? • What is the mix between genders in your company at Senior Management / Middle Management or Technical / Workforce (Shop floor) levels? • Do you have training and progression examples that you can describe? Notes: o Noting any evidence for this? o Female employees at higher management or skilled levels? o Clear policy for training and progression that is open to all.
Primary respondents	Government for policy
Secondary respondents	All sub-sectors
Interview Structure	Interview by trained team by Skype
Link to Analysis	What does reality look like compared to expectations based on policy? Time lag may occur? Is this an issue>

Skills shortage

Questions to be asked	• **Is there a skills shortage in your particular sector (or any other linked sector)?** • Estimation of the skills shortage for each sub-sector from the local economy and if these have been filled by foreign labour: • Number • What skills are they missing? • ISCO codes and description Notes: o Yes / No – is there any evidence for this? o Examples of where these have been filled by non-local (foreign) labour? o Clear policy for training and progression that is open to all. o Impacts – Example… not enough skilled processing workers to process and smoke billfish so either bring in more skilled workers from elsewhere or not be able to increase production and revenue from available resources. o What are the impacts? • • How can government can sensitise the local youth about the various job opportunities within the sector and your sub-sector in particular? • What kind of incentive scheme would encourage them to enter the industry?
Primary respondents	Key companies / organisations in all sub-sectors
Secondary respondents	
Interview Structure	Interview by trained team
Link to Analysis	Estimation of total skilled requirements by ISCO classification. Number of total skilled by ISCO currently ⇨ GAP

Costs for foreign (non-local) labour

Questions to be asked	**What are the costs related to bringing in foreign workers?** • Number of workers (as may be a scaling issues) • Cost initial per worker (recruitment transport, housing, setup, permits etc)? • Costs recurrent per worker (wages, healthcare, pension etc)? • Why bring in foreign workers rather than local workers? • Is this permanent or temporary while local labour are trained? • Duration or foreign labour (if temporary)? Notes: o Identify where we know this has happened in sub-sectors (tuna targeting vessels, IOT factory) o Why has this happened? Availability of trained (or trainable) local staff? o Number of workers may reduce costs for larger employers. o Collect as much detail as possible with costs to generate a profile for a foreign worker costs. o Indicate if they pay standard wage and that is it or do they pay for extras direct for a lower wage (e.g. subsidised housing)? o Impact on local workforce and for company itself? o Check if this is just temporary and parallel development of local labour?
Primary respondents	All sub-sectors
Secondary respondents	
Interview Structure	Interview by trained team
Link to Analysis	⇨ Estimated costs (per worker by ISCO) and total over sector

Costs for upskilling local labour

Questions to be asked	**What are the costs related to upskilling / training local workers?** • Number of workers trained (as may be a scaling issues) • Cost initial per worker • Costs recurrent per worker • Why choose to upskill local workforce? **Notes:** o Is there any evidence for this and identify if any examples of this are occurring? o Examples of where upskilling / training of local labour has occurred or is planned? o Clear policy for training and progression that is open to all. o Impacts – Example… not enough skilled processing workers to process and smoke billfish so either bring in more skilled workers from elsewhere or not be able to increase production and revenue from available resources.
Primary respondents	All sub-sectors
Secondary respondents	Any organisation / company that does specific training or could do training.
Interview Structure	Interview by trained team
Link to Analysis	Cost estimates.

Labour gaps / Human capacity needs

Questions to be asked	**If there is a labour / skills gap what are the missing requirements per sub-sector?** • Number of FTE workers missing (by ISIC and ISCO codes) • Why is this? • Impacts • Solutions • Opportunities • Restrictions / Hindrance in place? **Notes:** o Is there any evidence for this and identify if any examples of this are occurring? o Examples of where there is a skills gap. ISIC And ISCO codes to identify the sector and where the gaps are o What are the impacts? Examples o Management requirements for good practice given size and complexity.
Primary respondents	All sub-sectors
Secondary respondents	Solution providers…
Interview Structure	Interview by trained team
Link to Analysis	HC Needs.

Annex 5: List of data collectors recruited for the survey

Name		Location
Janette	Camille	Baie St Anne Praslin
Benoit	Fred	Baie St Anne Praslin
Anielle	Hennie	Baie St Anne Praslin (consolation/ Anse La blague
Anna	Payet	Beau Vallon
Damien	Payet	Beau Vallon
Boniface	Maria	Grand Anse
Bonte	Erica	Grand Anse
Jacques	Edith	La Digue
Philiana Cinirita	Radegonde	La Digue
Sylvette	Esparaon	LA Digue
Pillay	Pamela	La Gogue
Nancy	Monnaie	Praslin (Marie Jane Estate)
Belle	Carol	Morne Blanc
Bistoquet	Kevin	Pascal Village
Maria	Brioche	Praslin
Agnes	Vidot	Praslin (grand Anse)
Elna	Stravens	Praslin (grand Anse)
Missia	Dubignon	Praslin (Cote D'or)
Benstrong	Sylma	Pte Larue
Marie	Gemma	Takamaka
Solin	Faridienne	Takamaka
Brita Boniface	Boniface	SFA
Vanessa	Lagrenade	SFA
Bernard	Theresine	SFA
Julienne	Melanie	SFA
Natiffa	Bamboche	SFA
Nathalie,Samantha	Asba	Ma Joie
Brina	Brutus	Belonie
Chantal	Herminie	Ma Joie
Shannon	Lesperance	Anse Boileau
Andy Kenneth	Labiche	Beau Vallon
Dayanne	Leon	Bel Ombre
Lucianne,Aimee	Boniface	Grand Anse

Annex 6: Data validity and verification table.

#	Data element	Database Table	Collection Method and Requirements	Task	Analysis Routine
1	Number of FT employees (All companies / organisations)	Questionnaire BASE	Questionnaires to all companies and organisations	7	Number of FT and PT (with proportion) workers by fishery sub-sector and for the sector overall (broken down by ICSE-18-A)
2	Number of fishers + Sub-sector	TBD	Interview with SFA / Census to determine number of workers (FTE).		
3	Wage level +Sub-sector	Questionnaire BASE	Questionnaires to all companies	7	Distribution of wages for workers in each fishery sub-sector and the sector overall ⇨ Sectoral analysis ⇨ By ISCO ⇨ By ICSE-18-A
4		Interview_Fishers	Interviews with fishers		
5	Wage level + Sub-sector + Nationality	Questionnaire BASE	Questionnaires to all companies	7	Distribution of FTE wages / earnings for workers in each fishery sub-sector by nationality ⇨ National vs Foreign worker gap analysis ⇨ By ISCO ⇨ By ICSE-18-A
6		Interview_Fishers	Interviews with fishers		
7	Wage level + Sub-sector + Nationality + Gender	As above	As above	7	Distribution of FTE wages / earnings for workers in each fishery sub-sector by gender ⇨ Gender pay gap analysis (Task 9) ⇨ By ISCO ⇨ By ICSE-18-A
8	Wage level + Sub-sector + Nationality + Age	As above	As above	7	Distribution of FTE wages / earnings for workers in each fishery sub-sector by age ⇨ Age discrimination analysis
9	Number of fishers + Nationality + Sub-sector	As above	As above	8	Proportion of workforce (number of individuals) of Seychellois nationality

#	Data element	Database Table	Collection Method and Requirements	Task	Analysis Routine
					⇨ By ISCO ⇨ By ICSE-18-A
10		As above	As above	8	Proportion of workforce (number of individuals) not of Seychellois nationality ⇨ By ISCO ⇨ By ICSE-18-A
11		As above	As above	8	Proportion of workforce (FTE) of Seychellois nationality ⇨ By ISCO ⇨ By ICSE-18-A
12		As above	As above	8	Proportion of workforce (FTE) not of Seychellois nationality ⇨ By ISCO ⇨ By ICSE-18-A
13		As above	As above	8	Proportion by sector (number of individuals and FTE) of Seychellois nationality; ⇨ By ISCO ⇨ By ICSE-18-A
14		As above	As above	8	Proportion by sector (number of individuals and FTE) not of Seychellois nationality; ⇨ By ISCO ⇨ By ICSE-18-A
15	Number of fishers + Nationality + Gender + Sub-sector	As above	As above	9	Gender pay gap analysis (inter and intra sectors) ⇨ By ISCO (where possible) ⇨ By ICSE-18-A
16		As above	As above	9	Wage / earnings ranges and variability by gender with sectors
17	Qualitative description of opportunities by sub-sector	GENDER_OPP	Interview with key stakeholders (to be identified) – questions to be asked: Are opportunities gender equal in sub-sector XX?	9	Gender based equality of opportunities within each sector (requires age-based analysis as well to show if situation is

#	Data element	Database Table	Collection Method and Requirements	Task	Analysis Routine
			Opportunity refers in this case to opportunities for: Employment Training Progression		changing over time) (by ISCO / ICSE-18-A coding if possible[39]).
18	Wage level + Sub-sector + Nationality + Gender + Age	SC_Sector_Pay_Rates	Comparison of mean + sd of other sectors. Where possible comparison by nationality, gender and age	10	Mean and standard deviation of other sector wages and earnings in Seychelles.
19	Sub-sector required (current and projected) numbers	Questionnaire BASE Fisher_Interviews		10	Estimation of the skills shortage for each sub-sector from the local economy and if these have been filled by foreign labour (by ISCO / ICSE-18-A coding if possible).
20	Sub-sector current numbers (FTE)	Sub_Sector_Interviews	Questionnaire / Interviews		Raising and estimates based on discussions within sub-sectors (by ISCO code).
21	Estimated cost per (FTE) to bring in to the country (SINGLE SETUP)	Foreign_Labour_Costs	Questionnaire / Interviews by sector where foreign labour occurs	10	Estimate of additional costs to bring in foreign labour (per worker) – setup by sub-sector (by ISCO code).
	Estimated cost per (FTE) to for foreign worker per month.	Foreign_Labour_Costs	Questionnaire / Interviews by sector where foreign labour occurs	10	Estimate of additional costs to bring in foreign labour (per worker) – cost per month by sub-sector (by ISCO code).
	Estimated number of months foreign labour will be used	Foreign_Labour_Times	Questionnaire / Interviews by sector where foreign labour occurs	10	Estimate of number of months predicted for foreign labour (per worker) – number months by sub-sector (by ISCO code).
22	Estimated cost per (FTE) to upskill local workers (SINGLE SETUP)	Upskilled_Labour_Costs	Questionnaire / Interviews by sector where foreign labour occurs	10	Estimate of additional costs to upskill Seychelles labour force (per worker) (by ISCO code).
	Estimated cost per (FTE) to for upskilled	Upskilled_Labour_Times	Questionnaire / Interviews by sector where foreign labour occurs	10	Estimate of additional costs per month of upskilled Seychelles labour force (per worker per month) (by ISCO code).

[39] May not be possible to identify the employment status for forward projections of opportunities as they may be FT employees, contracted long-term or short-term to fit the changing situation. May just be the outline numbers by ISCO.

#	Data element	Database Table	Collection Method and Requirements	Task	Analysis Routine
	Seychellois worker per month.				
23	Labour Gap Analysis Estimates (by ISIC by ISCO)	Labour_Gap_by_Subector	Questionnaire / Interviews by sector where foreign labour occurs	10	Estimate of requirements per sector (by ISCO code).
24	Labour Gap Analysis Calculated (by ISIC by ISCO)	Questionnaire_BASE Labour_Gap_by_Subector Foreign_Labour_Costs Foreign_Labour_Time Upskilled_Labour_Costs Upskilled_Labour_Times	Simple calculation	10	Difference between actual (Seychelles) and actual (Seychelles + foreign) form estimated ⇨ Human capacity needs by sector (including level of expertise).
25	Wages / Earnings by sector	Wages_by_Sector	Other sector data from Government sources.	11	Analysis of trends by sector using other data sources.
26	Human Capacity Needs (by ISIC by ISCO)	Human_Capacity_Needs	Interviews – key stakeholders in Not just numbers by sector (ISIC) but skills (ISCO code)	12	Estimates of human capacity needs from stakeholders. Also need estimates for management needs based on fisheries (number / size / complexity based on good practice), e.g. MCS needs given fishery sizes.

Annex 7: Summary of Number of Respondents by ISCO Code

ISCO Occupation Code	Number of Respondents
622 Fishery workers, hunters and trappers	910
933 Transport and storage labourers	572
6222 Inland and coastal waters fishery workers	561
921 Agricultural, forestry and fishery labourers	504
932 Manufacturing labourers	284
6223 Deep-sea fishery workers	168
818 Other stationary plant and machine operators	126
634 Subsistence fishers, hunters, trappers and gatherers	99
312 Mining, manufacturing and construction supervisor	92
723 Machinery mechanics and repairers	92
6224 Hunters and trappers	75
833 Heavy truck and bus drivers	75
541 Protective services workers	70
315 Ship and aircraft controllers and technicians	67
242 Administration professionals	67
241 Finance professionals	67
7511 Butchers, Fishmongers and Related Food Preparers	67
314 Life science technicians and related associate professionals	67
313 Process control technicians	61
335 Regulatory government associate professionals	59
112 Managing directors and chief executives	56
121 Business services and administration managers	54
441 Other clerical support workers	53
911 Domestic, hotel and office cleaners and helpers	42
143 Other services managers	42
331 Financial and mathematical associate professionals	40
751 Food processing and related trades workers	38
432 Material-recording and transport clerks	34
512 Cooks	33
8160 Food and related products machine operators	27
6222 Aquatic life cultivation workers	25
411 General office clerks	25
741 Electrical equipment installers and repairers	23
941 Food preparation assistants	22
122 Sales, marketing and development managers	20
131 Production managers in agriculture, forestry and fisheries	17
835 Ships' deck crews and related workers	15
213 Life science professionals	15
214 Engineering professionals (excluding electrotechnology)	15
721 Sheet and structural metal workers, moulders and welders, and related workers	15
834 Mobile plant operators	15
332 Sales and purchasing agents and brokers	14
325 Other health associate professionals	13
226 Other health professionals	13
132 Manufacturing,mining,construction and distribution managers	12
932 Manufacturing labourers	12
522 Shop salespersons	11

ISCO Occupation Code	Number of Respondents
431 Numerical clerks	10
222 Nursing and midwifery professionals	9
235 Other teaching professionals	9
133 Information and communications technology service managers	9
311 Physical and engineering science technicians	9
243 Sales, marketing and public relations professionals	9
832 Car, van and motorcycle drivers	9
9999. Not elsewhere included (nei)	9
216 Architects, planners, surveyors and designers	7
215 Electrotechnology engineers	7
412 Secretaries (general)	6
251 Software and applications developers and analysts	6
111 Legislators and senior officials	6
813 Chemical And photographic products plant and machine operators	6
212 Mathematicians, actuaries and statisticians	6
334 Administrative and specialized secretaries	5
134 Professional services managers	5
423 Material recording and transport clerks	4
312 Mining, manufacturing and construction supervisors	4
7512 Bakers, Pastry-cooks and Confectionery Makers	4
422 Client information workers	4
421 Tellers, money collectors and related clerks	4
831 Locomotive engine drivers and related workers	3
816 Food and related products machine operators	3
351 Information and communications technology operations and user support technicians	3
814 Rubber, plastic and paper products machine operators	3
227 Medical Assistant professionals	3
712 Building finishers and related trades workers	3
142 Retail and wholesale trade managers	3
521 Street and market salespersons	3
252 Database and network professionals	3
523 Cashiers and ticket clerks	2
713 Painters, building structure cleaners and related trades workers	2
524 Other sales workers	2
515 Building and housekeeping supervisors	2
413 Keyboard operators	2
333 Business services agents	2
261 Legal professionals	2
516 Other personal services workers	1
141 Hotel and restaurant managers	1
221 Medical doctors	1
722 Blacksmiths, toolmakers and related trades workers	1
1021 Non-commissioned armed forces officers	1
113 Legislators and senior officials	1
962 Other elementary workers	1
711 Building frame and related trades workers	1

Annex 8: Validation workshop participants

Wednesday 26th January 2022

Name	Affiliation
Angelique Adeline	Trade Department
Ronny Matatiken	Hunt Deltel
David Dorby	Land Marine
Lenny Gabriel	SIB
Selwyn Edmond	Seaward
Jan Robinson	SWIOFish
Jean Alcindor	Ministry of Education
Joelle Perreau	UniSey
Helda Port-Louis	IOT
Sharif Antoine	SFA
Michel Marguerite	SFA
Robert Wakeford	MRAG
Rondolph Payet	MRAG
Pippa Howarth	MRAG
Andrew Temple	MRAG

Thursday 27th January 2022

Name	Affiliation
Leeroy Camille	Department of Employment
Kevin Bistoquet	National Bureau of Statistic (NBS)
Maryana Labonte	Ministry of Finance
Kirsten Arnephy	National Bureau of Statistic (NBS)
Sharif Antoine	SFA
Samantha Manes	Rassool Processing (Anse Boileau)
Louis Bosy	Ocean Basket
Juliet Gerry	Agency for National Human Resource Development
Muditha Gunatilake	Marlu Seychelles, fish exporter
Maryana Labonte	Economic Planning Department
Robert Wakeford	MRAG
Rondolph Payet	MRAG
Pippa Howarth	MRAG
Andrew Temple	MRAG